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Industrial Standardization

SEP 24 1941

and Commercial Standards Monthly

September

American Safety Standards Aid in Nation's Drive for Industrial Safety

(See Pages 221, 229, 231, 235)

1941

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Industrial Standardization

And Commercial Standards Monthly

Published Monthly by

American Standards Association

29 West 39th Street, New York, N. Y.

with the cooperation of the National Bureau of Standards

RUTH E. MASON, Editor

Our Front Cover: This electric welder with his safety helmet typifies the protection to workers provided by the national safety standards already approved by the American Standards Association. *Photo by Charles Phelps Cushing.*

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Standardization is dynamic, not static. It means not to stand still, but to move forward together.

Subscription price $4.00 per year U. S. and Canada (foreign $5.00); Special to schools and libraries $2.00 (foreign $3.00); single copies 35 cents

September, 1941

Vol. 12, No. 9

Entered as Second Class Matter, February 14, 1941, at the Post Office at New York, N. Y., under the Act of March 3, 1879.

BUSINESS executives think of the value to them of the work of the American Standards Association in terms of standards for the materials used directly in their manufacturing processes. Standards of piping, lumber, valves, keys, gears, and hundreds of other items, make purchasing and maintenance easier and cheaper. However, the list of standards issued by the ASA shows any manufacturer many standards which are of great direct value to him besides these materials standards.

American Safety Standards, for example, are on the shelves of engineers and superintendents in most manufacturing plants. In many cases state laws insist that the provisions of these standards be followed by all under their jurisdiction.

This safety work alone, translated into terms of lives saved, and working time saved, and human suffering prevented may well make every corporation and individual feel obligated to support the work of the American Standards Association.

—George S. Case, Chairman of the Board,
The Lamson & Sessions Company

New Standard Shows How to Find Causes Of Industrial Accidents

Approved standard provides method of compiling injury causes to show what was wrong with the machine or what unsafe act caused injury to workers

Information required is practical and easy to collect

by Leonard W. Hatch

Chairman, ASA Sectional Committee on Standardization of Methods of Recording and Compiling Accident Statistics

IN THE new Standard Classification of Industrial Accident Causes, just approved by the American Standards Association as American Recommended Practice, an important forward step has been taken for the aid and guidance of all interested in the work of industrial accident prevention. It presents a greatly improved technical tool for that work.

This tool is the statistical analysis of causes of accidents.

In the May, 1937, issue of INDUSTRIAL STANDARDIZATION, in an article concerning the then recently approved American Standard for Compiling Industrial Injury Rates, the present writer noted that "Two statistical tools are indispensable for an intelligent attack on industrial accidents. One of these is accident cause analysis; the other is accident rates." To the method for compiling injury rates then approved is now added a classification of accident causes, and thus both those statistical tools are now available in standard form under the aegis of the American Standards Association.

Widest Cooperation on Standards

The stamp of the Association on both these standards means that they are the product of the widest possible cooperation of those interested in the subject and have been given the most painstaking examination and study in every detail, as well as covering the whole document. This hardly needs to be emphasized here. In addition to the well-known democratic procedure of the American Standards Association the fact that both projects are sponsored by national associations—the National Safety Council, the National Council on Compensation Insurance, and the International Association of Industrial Accident Boards and Commissions—guarantees this wide cooperation and thorough preparation.

As noted in the article above referred to, this cause classification, like the rates standard, was undertaken as a revision of a standard proposed in Bulletin 276 of the United States Bureau of Labor Statistics published in 1920. This Bulletin presented the first results of the systematic effort to develop rules and classifications for standardizing industrial accident statistics.

It was pointed out in the 1937 article that, "Useful as the cause classification of Bulletin 276 has been (and as the pioneer in that field its merit has been great) experience has demonstrated that it has serious defects. These have been chiefly due to its failure to go sufficiently beneath the surface to get at the primary elements of causation which must be dealt with if the ultimate factors in accidental occurrence and injury are to be forestalled."

The cause classification now presented for standard American practice goes deeper below the surface than did this original standard and comes more closely to the primary causes with which preventive efforts have to deal if they are to be most successful. Anyone who will make comparison of the classification in Bulletin 276

with this new classification will see this, it is believed.

Broadly speaking, the shortcomings of the former arose from an assumption of simplicity or "singleness," if that expression may be used, in the factors leading to an accident. The new classification, on the other hand, recognizes the complexity or multiplicity of factors which produce accidents.

Specific "Cause" Is Shown

More specifically, Bulletin 276 largely confines itself to categories of objects (such as machines, apparatus, tools, etc.) or of accidental occurrences (such as falling object, fall of person, etc.) as being themselves "causes," whereas the new classification seeks to bring out what condition of the object (unguarded, out of repair, etc.), or what practice or act of a person, precipitated the accidental occurrence.

To illustrate by a very simple example, if an accidental injury occurred on a punch press, the old classification stopped with its assignment, with respect to cause, as due to "punch press" under the general class "machines." The new, however, calls for a further subdivision by additional classifications to show the physical condition of the machine (whether in good repair, whether guarded, etc.) and also to show the act of the operator which precipitated the accident. This act might be removal of guard, failure to follow operating instruction, etc. In a word, the new classification follows through in the quest for the accident cause to bring out the *unsafe condition* or the *unsafe act* which can truly be designated as *cause* of the accident rather than the loose and essentially superficial designation showing only the machine as cause.

The difference in the resulting statistics between the old and the new classification may be illustrated as follows: Under the old classification a plant having punch presses among its machines would find out only what number of its accidents were associated with punch presses. By the new method, on the other hand, it would further find out how many of its punch press accidents were due to unsafe conditions of the presses and in addition how many were due to each kind of unsafe condition. It would also find out how many were due to unsafe acts of operators or others, and how many were due to each kind of unsafe act.

Will Show Why Accidents Happen

Statistics revealing these latter factors as well as the former will surely guide those responsible for safety in a plant to the true causes of its accidents far and away more completely and surely than the old classification could. The fact that the new classification will produce this result is at once its justification and commendation as a greatly improved technical tool for safety.

From the above it is obvious that the new standard classification is much more elaborate than the old. It was bound to be so, because it presents not one but several classifications. These correspond to the five different "factors" in the causation of accidents which it distinguishes, and are in addition to the one or two categories of the old classification which the new also develops and defines.

This greater elaboration was, as a matter of fact, a source of no little concern and debate in the sectional committee during its long and earnest consideration of the project. Grave fears were expressed lest something should be developed that would be too elaborate, would call for too detailed an examination of accidents as they occurred, and might leave the possibility of too varied interpretation to be capable of successful practical application. Lest such fears should arise in other quarters, it is important to record here certain features of the new classification which safeguard it from any such result.

Many Factors in Accident Cause

In the first place, as already indicated, if the new classification is more complex it is so only because the cause of an accident is indeed more complex; in other words, it involves more factors than were recognized in the former classification. In order to get closer to the truth about accident causation, therefore, the classification itself had to be more complex.

In the second place, a guiding principle adhered to throughout was that of keeping the classification upon the solid and practical ground of providing the statistical information needed for guidance in accident prevention. As stated in the introduction, "The purpose is to provide a statistical method of recording the accident facts which are essential for accident prevention."

In the third place, the classification was worked out with regard to the practical availability of the factual data necessary for its use, and was carefully kept within the limits of what the practical safety man naturally seeks to know to make plant and operation safe. The analysis required by the classification does not lead off into the vague realms of physics, biology, or psychology where no doubt the very ultimate in the chain of causation of an accident might lead if we had the knowledge to find our way therein. It does, however, keep within the bounds of the kind of information for which anyone inquiring about an accident would naturally look if intent upon finding out what really did cause the accident.

New-fangled and artificial questions about an accident are not required but simply the ordinary and familiar inquiries which foreman or safety man would make.

To illustrate, using a punch press accident again as an example, a commonplace conversation such as the following would be a fair example of the naturalness of the factual inquiry required to place such an accident in each of the categories of factors set up in the classification. This conversation is supposed to be by telephone between the superintendent of a factory, a doctor in his office, and the foreman of a shop.

DOCTOR. Bill Smith has just come into my office with two badly crushed fingers. I assume you want me to take care of it?

SUPT. Yes, take good care of him. Any idea how he got hurt?

DOCTOR. He says his hand was caught in the machine he was working on.

SUPT. (*on phone to foreman of Bill's shop*) What machine was Bill Smith working on when he got his fingers crushed?

FOREMAN. It was a punch press.

SUPT. How did it happen?

FOREMAN. His fingers got caught between the plunger and the die.

SUPT. But wasn't that press provided with a guard?

FOREMAN. Yes, with a sweep guard such as we have on all the presses.

SUPT. Then how did he get his fingers under the plunger?

FOREMAN. To tell you the truth, Bill had taken the guard off.

SUPT. What did he do that for?

FOREMAN. He said it bothered him with his work.

SUPT. Hadn't he been instructed never to do that?

FOREMAN. Yes, he was when he started working on that press last year. They are all told about that when they begin operating such a machine.

SUPT. Well, it looks as though the rule didn't work in Bill's case. How are we going to make sure there are no more such cases?

FOREMAN. All I can see is that we shall have to either fix these guards or some others so they can't be taken off, or bear down harder on enforcing the rule. The truth is, this is not the first time a guard has been taken off but in the one other case some time ago I found out about it before anyone was hurt and stopped it.

A statistical classification whose requirements call only for such a natural and common-sense examination of an accident as this is surely in no way beyond the realm of the practical. It is, indeed, "down on the ground" for everyday practical use.

Finally, "the proof of a pudding is in the eating." Since the earlier draft of the classification was circulated for study and criticism it has been put to the test of actual use by a number of agencies both public and private, and has met that test successfully. It is not too much to say that such test by use has already been sufficient to put the new classification quite beyond the category of the experimental. Most notable evidence of this, perhaps, is the fact that the *Manual on Industrial Inquiry Statistics*, recently published by the U.S. Bureau of Labor Statistics (Bulletin No. 667) for the guidance of administrative agencies compiling such statistics, adopted essentially this new classification in its then form as the standard for statistics of accident causes.

In this attempt to briefly outline some of the more significant characteristics of the new standard classification for accident causes the writer feels it is only due to note the original source of its basic features.

The new American Recommended Practice for Compiling Industrial Injury Causes (Z16.2-1941) has been published in two parts, Part I covering Selection of Accident Factors and Part II, Detailed Classification of Accident Factors. The entire standard, including both parts, is available from the American Standards Association at $1.00.

A companion document, the American Standard Method of Compiling Industrial Injury Rates (Z16.1-1937), was also prepared by the ASA Sectional Committee on Standardization of Methods of Recording and Compiling Accident Statistics and approved by the American Standards Association. Copies of this standard are available from the ASA at 20 cents each.

Heinrich Did Pioneer Work

This classification is essentially a development of the pioneer studies in accident cause analysis and classification originally made by H. W. Heinrich, Assistant Superintendent, Engineering and Inspection Division, at the Travelers Insurance Company. Because of his progressive work in this field he was persuaded by the writer as chairman of the sectional committee, to head the original small subcommittee which prepared the first full draft of a cause "code," as it was then designated, for consideration by the sectional commit-

tee. That draft, which was chiefly his work, was published by the American Standards Association for purposes of study and criticism in 1937. Since that time it has been through the fires of criticism and debate in the sectional committee and in a small conference committee to which it was referred for revision and development in the light of its previous discussion. This latter committee was especially indebted in addition to Mr. Heinrich to Max D. Kossoris, specialist in accident and compensation statistics of the U.S. Bureau of Labor Statistics. Mr. Kossoris collaborated with Mr. Heinrich in extended and painstaking revisions which the sectional committee and the conference committee called upon them to make. In thus building its final standard out of the "Heinrich Code," as the draft published in 1937 came to be called, the committee insured that what have now come to be recognized as the most progressive as well as scientific ideas in this field were utilized as its guide.

One other characteristic of this new standard should be noted here. This is its challenging character not only as a statistical device but as a stimulus to more thoroughgoing investigation of accident causes.

Doubtless in large areas of the field the procedure it calls for is now a matter of routine. But there are still areas where industrial accidents are not yet subjected to that scrutiny as to causes which is a prerequisite of effective measures for prevention. One of the important virtues of this classification is that in such cases it not only necessitates more thorough inquiry into causes in order to make accurate use of its classifications, but also it practically points out what lines of

Accident Statistics Committee Shows Broad Representation

The ASA Sectional Committee on Standardization of Methods of Recording and Compiling Accident Statistics (Z16) is a typical, representative committee organized under the procedure of the American Standards Association. It brings together many groups concerned with prevention of industrial accidents under the leadership of the International Association of Industrial Accident Boards and Commissions, the National Council on Compensation Insurance, and the National Safety Council. Members of the committee are:

Leonard W. Hatch, New York State Industrial Board and the International Association of Industrial Accident Boards and Commissions, *Chairman.*

Cyril Ainsworth, American Standards Association, *Secretary.*

International Association of Industrial Accident Boards and Commissions (Sponsor), *William H. Chestnut; Evan I. Evans; O. A. Fried; Leonard W. Hatch*

National Council on Compensation Insurance (Sponsor), *H. F. Richardson*

National Safety Council (Sponsor), *C. B. Boulet; L. A. DeBlois; R. L. Forney*

National Safety Council, Metals Section, *H. J. Griffith*

National Safety Council, Rubber Section, *R. L. Forney*

American Gas Association, *E. P. Durfee; James B. Douglas (alternate)*

American Iron and Steel Institute, *Grover C. Brown*

American Petroleum Institute, *H. N. Blakeslee*

American Statistical Association, *Eugene B. Patton*

Association of American Railroads, Operating Division, Safety Section, *T. H. Carrow*

Electric Light and Power Group, *A. B. Campbell (alternate)*

International Association of Governmental Labor Officials, *Max D. Kossoris*

Interstate Commerce Commission, *Edward Crane*

Liberty Mutual Insurance Company, *J. H. Forest, H. D. Locke (alternate)*

Lumber Mutual Casualty Company, *H. G. Wiberg*

Metropolitan Life Insurance Company, *Robert J. Vane*

National Coal Association, *J. William Wetter*

National Conservation Bureau, *Paul Dorweiler; Edward R. Granniss (alternate)*

National Electrical Manufacturers Association, *G. E. Sanford*

New York State Department of Labor, *Eugene B. Patton*

New York State Industrial Board, *L. W. Hatch*

New York State Insurance Fund, *Grady H. Hipp; Roger Williams (alternate)*

Ohio Industrial Commission, *Evan I. Evans*

Ontario Workmen's Compensation Board, *T. Norman Dean*

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U. S. Department of Labor, *S. W. Wilcox*

U. S. Department of Labor, Bureau of Labor Statistics

U. S. Navy Department, *Edward B. Landry*

Utah Industrial Accident Commission, *O. F. McShane*

Wisconsin Industrial Commission, *O. A. Fried*

inquiry are necessary for such prevention scrutiny. This is done in its definitions of cause factors and in its rules for their selection, which are provided along with the formal classifications. Here is a guide to investigation, as well as to classification, as a means to more illuminating information for use in accident prevention.

The writer, who has had a hand in most of the work done in this country in standardizing of industrial accident statistics, believes that this new standard classification for accident causes constitutes one of the most notable and significant developments in that field, particularly as it concerns the use of statistics for the purpose of accident prevention. He is fully convinced that this is one of the important contributions, among many others, that the American Standards Association, through its highly democratic process of conclusion by general agreement, has made to the cause of industrial safety.

Canners' Association Publishes Survey on Grade Labeling

Results of a survey on the attitude of women toward grade labeling of canned fruits and vegetables carried out for the National Canners' Association by the research firm of Elmo Roper have just been published by the Association. The study was based on 7,500 interviews and has been under way since last January when the Association appropriated $40,000 for it. Only 29 per cent of those interviewed had ever heard of grade labeling and only 15.5 per cent had ever bought by grades, the report shows.

Seven major findings were reported:

1. A great majority of the public is satisfied with its experiences with canned foods.
2. The price of canned foods is not regarded as being at all unreasonable.
3. Most people now buy canned foods by brand; 85 per cent have no difficulty in picking out the quality or kind they want and most people are not aware of the absence of any important information on the labels of canned foods.
4. There is very little active demand for grade labeling on the part of housewives generally.
5. Despite this, more than half of the people interviewed showed a receptivity to the idea of grade labeling when they were told about grades by survey interviewers.
6. Much confusion exists as to what grade labels might mean: many of those who believed it might be a good idea for the government to grade all canned food, had a notion that the grading might be an index of vitamin content and general nourishment.
7. The report concluded that there is a wide divergence of opinion as to what are the most important factors in quality which might cause considerable confusion among consumers in cases where grade labeling is used. No one factor was chosen by as many as three-quarters of the women as being most important, it is reported. This makes it difficult, it concludes, to find a combination of qualities which will permit labeling a product "Best" and have it mean what a majority of women mean by "Best."

The document, "A Study of Certain Attitudes of Women Toward Canned Fruits and Vegetables," has been copyrighted by the National Canners' Association with a warning that it must be reproduced completely or not at all.

Women's reactions to grade labeling are also being studied in another survey, carried out under the direction of Dr. Alice L. Edwards, sponsored by the U. S. Department of Agriculture. In this survey only the reactions of consumers who have bought grade-labeled goods are considered. This survey is now nearing completion.

ASA Considers Defense Standard On Concentration of Cadmium

The first American Defense Emergency Standard for a toxic dust or gas has just been started through the emergency procedure of the American Standards Association for approval. The emergency standard specifies the permissible concentration of cadmium which may be considered safe for workers. It is now being considered by the Safety Code Correlating Committee of the American Standards Association. If approved by the SCCC, the proposed standard will be submitted to the chairman of the Standards Council as provided in the ASA Defense Emergency Procedure.

The proposed emergency standard was developed by the U.S. Public Health Service acting as an Emergency Technical Committee under the ASA Emergency Procedure.

Portland, Maine, Uses Gypsum Concrete Standard

The new American Standard Building Requirements for Reinforced Gypsum Concrete, first completed standard in the ASA building requirements series, has been approved by the Municipal Office of Portland, Maine, for use in connection with its Building Code.

Courtesy Black Star

How To Prevent Collapse of Portable Grandstands

The new American Standard Specifications for Portable Steel and Wood Grandstands answers the question "How strong do portable grandstands have to be to prevent collapse under sudden mass strains?"

TO the many organizations, cities, and states responsible for the safety of sightseeing crowds at fairs, parades, or other special events, the first national standard specifications for portable grandstands, just approved by the American Standards Association, will offer one solution for a bad headache.

The new American Standard Specifications for Portable Steel and Wood Grandstands, second standard to be published under the program of the Building Code Correlating Committee, provides construction requirements which may be used by city and state building officials as well as by organizations providing large-scale entertainment.

Need for such a code of safe construction re-

quirements is called to public attention at least several times a year when hastily erected grandstands suddenly collapse under the sudden strain of an exceptionally exciting moment during the entertainment. Such a strain occurred, for example, during the 1938 Pacific International Air Races at Oakland, California, and a bad accident was only averted because the portable grandstands had been given careful inspection. When a flyer crashed directly in front of the stands, the spectators rose en masse, and when the plane burst into flames the crowd in a panic scattered in all directions. Severe impact and lateral strains were imposed on the grandstand as a result of this mass action. Only prompt action by officials in bringing the panic under control, coupled with previous careful attention to construction details of the grandstand, prevented collapse of the stands and probably large-scale injury or death. In many cases, as testified in newspaper accounts, holiday and sightseeing crowds are not so fortunate.

Research Gives Data on Strains

Requirements of the new standard are based on research carried on by the ASA Committee which developed the standard in cooperation with the Pennsylvania Department of Labor and Industry which asked the ASA to undertake the grandstand project. The tests[1] were designed to show what happens when occupants of a grandstand suddenly rise together or suddenly return to a sitting position, or when they grip the front of the seat boards with their hands. These tests gave technical information on the number of pounds of stress per linear foot and per square foot that may be expected as a result of movements of occupants of a grandstand.

The information obtained from these tests was the basis for the loading requirements in the standard which provide that all parts of the grandstand shall be designed to support a live load of not less than 100 pounds per square foot and that all seats and footboards shall support not less than 120 pounds per linear foot. The stands shall resist a horizontal swaying force of 25 pounds per linear foot in a direction parallel to the seats and of 10 pounds in a direction perpendicular to the length of the seats, the standard provides. In the case of steel grandstands, all parts of the structure are to be so proportioned that the unit stress in pounds per square inch shall not exceed values given under the headings of tension, compression, bending, shearing, and bearing. Tables of allowable unit stresses are included for use in designing all wood parts.

The standard, which includes specifications for design and workmanship, loading, materials, allowable stresses, and special requirements for railings, aisles, and footboards, is the first of a series which is planned for grandstands. Fire hazards, fire-fighting equipment, sanitary arrangements, and methods of erection are some of the features provided in the scope of the general project which may be covered in other standards.

The work on grandstands was undertaken by the American Standards Association in 1931 at the request of the Pennsylvania Department of Labor and Industry. Under the provisions of a law covering protection from fire and panic the Department was called upon to inspect practically all grandstands erected in the state and to prescribe rules and regulations governing the erection and use of this type of equipment. The ASA committee started from scratch to develop the standard, no group of specifications having been previously developed. At the time of the organization of the ASA committee, however, the Pennsylvania Department had prepared a tentative draft of rules and regulations covering the construction, installation, and use of grandstands. This draft standard, together with comments and criticisms received as the result of public hearings

[1] See detailed account of these tests, ASA Bulletin, April 1932, page 123.

The new American Standard Specifications for Portable Steel and Wood Grandstands (Z20.1-1941) was prepared under the jurisdiction of the ASA Sectional Committee on the Safety Code for Grandstands. Kenneth H. Osborn, representing the American Society of Civil Engineers, is chairman of this committee, and Cyril Ainsworth, American Standards Association, is secretary.

A subcommittee of five men supervised the research work on which the standard was based and prepared the draft standard for consideration by the sectional committee. This subcommittee was:

S. W. Homan, Department of Labor and Industry, Harrisburg, Pa., *Chairman.*
C. H. Wetzel, Wayne Iron Works, Wayne, Pa.
C. J. Raider, United States Fidelity and Guarantee Corporation, Baltimore, Md.
Charles R. Weeks, Department of Labor, Trenton, N. J.
Arthur Upson, National Lumber Manufacturers Association.

Copies of the standard may be ordered from the American Standards Association at 60 cents each.

throughout the State of Pennsylvania, was turned over to the subcommittee on portable steel and wood grandstands of the ASA committee.

The subcommittee soon decided that it did not have sufficient technical information, particularly in reference to the horizontal forces produced by movements of the occupants of a grandstand, and, with the Pennsylvania Department of Labor and Industry, arranged for tests to determine just what these horizontal forces are.

The Wayne Iron Works of Wayne, Pa., arranged for the construction and setting up of test apparatus at their plant and tests were conducted by the subcommittee and a number of invited guests interested in the subject.

With the technical data collected from the tests as a background, the committee prepared a draft of a standard which was circulated for comment and criticism. The Pennsylvania Department of Labor and Industry also submitted the draft to public hearings held throughout the state. All the comments were collected and studied by the subcommittee and a new draft prepared which was adopted by the Pennsylvania Department as the official regulations for that state. The draft standard was then submitted by the subcommittee to the ASA Committee on Grandstands. Before the committee accepted the standard, however, questions were raised concerning the requirements for the use of wood in portable grandstands and the size of structural members specified, and many conferences were held before a final decision was made. As finally approved the standard provides that all structural members shall be not less than one-fourth inch thick except for the web of rolled structural shapes, which shall be not less than seventeen one-hundredths inch thick, and except for bent structural plate used for combined riser and tread which shall be not less than three-sixteenths inch thick.

Although the standard started through the procedure of the American Standards Association as a safety standard, progress of the building code program under the ASA Building Code Correlating Committee raised the question whether standard specifications for grandstands did not, rather, belong in the building field. Since building officials will in many cases have the responsibility for administering the requirements of the standard it was removed from the jurisdiction of the Safety Code Correlating Committee and placed under the building code program. It thus becomes the second in the series of building requirements standards to be completed and published. The first in the series was the American Standard Building Code Requirements for Gypsum Concrete.

Important provisions of the standard are already in use in some sections of the United States, following adoption of the original subcommittee report by the Pennsylvania Department of Labor and Industry.

The standard as finally completed was approved by the American Standards Association on the recommendation of the International Association of Governmental Labor Officials, as Endorsing Sponsor.

Australian Standards Association Reports on Year's Progress

The work of the Standards Association of Australia during the year ending June 30, 1940, was largely one of adaptation to special war tasks, the Annual Report of the SAA, received by the ASA in June, 1941, declares. Twenty-one emergency standards were completed and published during that time.

In addition to the emergency standards, the work done by the SAA Library in furnishing technical information has been one of the important developments, a technical information service having grown up as a result of the demands of industry. Some of the requests have made it necessary to prepare reports of some magnitude on the results of investigations carried out by the Library, the Association declares.

Outstanding work during the year was accomplished in the preparation of emergency aircraft standards, and in limiting the range of steel specifications used, as well as specifications for aluminum alloys and magnesium alloys.

ASTM Proposes Revisions on Pipe and Gypsum Standards

The American Society for Testing Materials has submitted the revised 1940 edition of Specifications for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded Seamless Steel Pipe for Ordinary Uses (ASA G8.7-1937; ASTM A 120-36) to the American Standards Association for approval as American Standard. The revised standard was recommended for approval by ASA Sectional Committee G8 on Zinc Coating of Iron and Steel and submitted to the ASA by the ASTM as sponsor for this project.

The ASTM has also submitted standard Specifications for Gypsum as a revision of American Standard A49.1-1933, ASTM standard C 22-25.

Any comments on the approval of these standards should be forwarded to the American Standards Association as soon as possible. Copies of the standards may be obtained from the ASA office or from the American Society for Testing Materials, 260 South Broad Street, Philadelphia.

Standard Protects Workers In Electroplating Operations

by Cyril Ainsworth

Secretary, ASA Sectional Committee on the Safety Code for Exhaust Systems

ANOTHER American Standard in the industrial hygiene field became available for use by industry through the recent approval by the ASA of the American Standard for Safety in Electroplating Operations.

This new standard outlines requirements for the protection of workers in those electroplating operations which may injure the health of operators through contact with gases, mists, or liquids. It applies to electroplating and deplating operations and to the anodizing of metals, and describes standard exhaust systems and methods for personal protection of the operator. Other requirements for electroplating and deplating processes, and uniform practices for the conduct of the work in order to reduce possible hazards to health are also given.

The writer has no figures available which would indicate the amount of plating work carried on by the industry, but he does not hesitate to say that electroplating is one of the most widely used processes. Chromium plating, arsenic plating, copper, brass, bronze, zinc, cadmium, tin, silver, gold, nickel plating, and lead plating are done in a variety of industries and for a variety of purposes. The defense program promises to bring about an even more extensive use of the process and many more workmen will, therefore, now be exposed to the hazards involved. The approval and publication of the standard is therefore especially timely.

Degree of Hazard Shown

Electroplating systems are classified in the standard according to the degree of hazard associated with them. Chromium plating and arsenic plating, for instance, are placed under the severe hazard classification. Cyanide solutions for plating copper, brass, bronze, zinc, and cadmium, tin plating from alkaline baths, anodizing aluminum and deplating operations that evolve gases are placed under the moderate hazard classification. The slight hazard classification includes cyanide solutions for plating silver and gold and acid or neutral solutions for plating copper, zinc, nickel, and lead. The degree of protection required for each of the classifications is specified.

Three sections of the standard contain the basic recommendations, covering specifications for exhaust systems, personal protection, and inspection and maintenance.

The section on exhaust systems sets up the criterion for safety that an exhaust system shall be so constructed and operated that the concentration of toxic materials in the air inhaled by the operators shall not constitute a health hazard. Suggestions for attaining this criterion are included in the appendix to the standard. The section continues with specifications for duct systems and refers to the Report on Fundamentals Relating to the Design of Exhaust Systems published by the American Standards Association. Air-cleaning devices, the discharge stack, and the source of suction are discussed.

Protective Clothing Is Required

Under the section on personal protection, the use of rubber boots or wooden-soled shoes, rubber aprons, and elbow-length rubber gloves is required for all persons who come in bodily contact with plating solutions. Goggles conforming to the American Standard Safety Code for Protection of Heads, Eyes, and Respiratory Organs of Industrial Workers (Z2-1938) are specified for use whenever there is danger of splashing of plating solutions. Rinsing water to use in emergencies to wash solutions or acids from the body is provided and a requirement is included that petrolatum or some other suitable ointment shall be furnished for use in coating the nostrils to prevent irritation of the membranes by chromic acid mist.

One of the most interesting and valuable sections of the standard is the Appendix. It has been written with the aim of presenting constructive suggestions for putting into effect the basic principles set forth in the body of the standard. The appendix points out that while threshold limits have not been accurately defined for all

of the toxic materials used in industry it is believed that if the degree of exhaust ventilation maintained is sufficient to keep the concentration of such substances in the atmosphere below one milligram in ten cubic meters of air (a figure which has tentatively been set for chromic acid), a safe working atmosphere will be obtained. The figure for chromic acid just cited has been generally accepted for a number of years and has been tentatively set by the committee on toxic dusts and gases as the proposed American Standard Allowable Concentration of Chromic Acid.

Important details in the design of plating tanks and of the exhaust system for such tanks are given. It is recommended that for Class I electroplating processes each exhaust manifold should exhaust at least 120 cubic feet per minute per square foot of tank area. An equation for computing the air to be exhausted is provided.

While the standard has been limited to actual electroplating operations, the appendix points out that tanks for pickling, cleaning, bright dipping, and galvanizing may produce hazardous atmospheric pollution and that it will frequently be necessary to ventilate tanks containing acids, alkalies, or organic solvents. The limitation of the standard to electroplating was not intended to imply that other operations were not also potentially hazardous. Many of the criteria in the standard for electroplating tanks can be applied directly to other tanks.

While the standard represents the combined technical points of view of the subcommittee which drafted the standard and of the ASA sectional committee on exhaust systems which reviewed and approved the standard for submittal to the ASA, it also represents or reflects the methods used in a large number of industrial plants throughout the country. A questionnaire designed to obtain information regarding present practice in typical plating plants and the measures employed by such plants in the elimination of potential hazards to health, needed by the subcommittee for drafting purposes, was sent to 150 representative firms conducting electroplating.

The draft of the proposed standard was revised five or six times by the subcommittee before consideration by the full sectional committee by correspondence and in meeting. The approval by the ASA therefore can truly be said to represent a real consensus of those interested in and affected by the standard. Doubtless, however, new techniques, new materials, and new forms of electroplating which may be introduced in the future will dictate the need for future revisions of the standard.

The subcommittee which drafted the new American Standard for Safety in Electroplating Operations (Z9.1-1941) started from scratch, collected technical information, consulted with others concerned, and carried forward the detailed drafting operation in such a manner that their final report was recognized by all as meriting support and promulgation.

Members of this subcommittee are:

J. J. Bloomfield, U.S. Public Health Service, *Chairman*
J. R. Allan, International Harvester Company
William Blum, National Bureau of Standards
S. W. Gurney, Liberty Mutual Insurance Company
Carl Huessner, Chrysler Corporation
*A. D. Brandt, U.S. Public Health Service
F. W. Sehl, Aetna Insurance Company

The work of the subcommittee was part of the general project of the ASA Sectional Committee on the Safety Code for Exhaust Systems, working under the administrative leadership of the International Association of Industrial Accident Boards and Commissions.

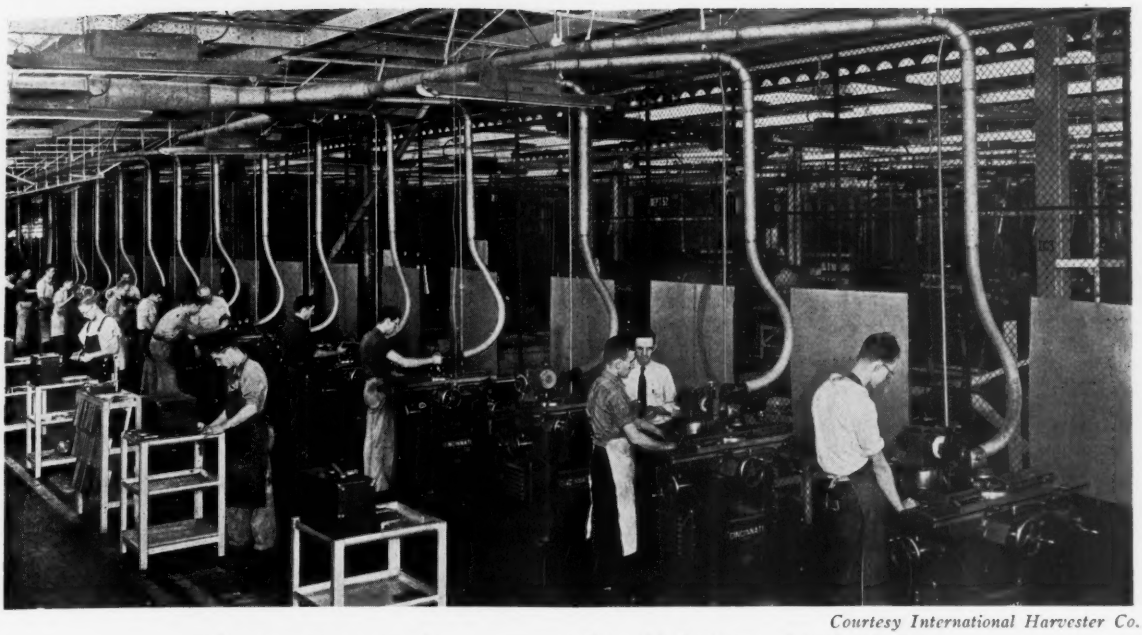
The standard is now on the press and copies may be ordered from the American Standards Association at 30 cents each. They will be available within the next two or three weeks.

* Prior to the appointment of Dr. Brandt, R. T. Page of the U. S. Public Health Service served as a member of the subcommittee.

Widen Headlight Testing Screen In Revised Inspection Requirements

The minimum width of the headlight testing screen, specified in the 1939 edition of the American Standard Inspection Requirements for Motor Vehicles as 8 feet, was increased to 10 feet in a revision approved recently by the American Standards Association.

The 1941 edition of the American Standard Inspection Requirements is available from the ASA at 25 cents per copy.



Courtesy International Harvester Co.

Exhaust systems are shown connected to this battery of tool grinders

ASA Approves Safety Standard For Grinding, Buffing, and Polishing

American Foundrymen's Association asks ASA approval on safety standard to protect workers from dust thrown off by grinding, buffing, and polishing equipment

IN 1935 the Board of Directors of the American Foundrymen's Association created a new staff section known as the Safety and Hygiene Section of the AFA. This section was established for the purpose of compiling uniform, practical information on safety and health for the use of the foundry industry. In listing the various fields of activity for the new section, the Board of Directors outlined the following objectives:

(*a*) "To assist in the standardization of dust-eliminating equipment and improvement of shop operation conditions in the foundry industry," and

(*b*) "To promote standards for dust elimination and control equipment in cooperation with agencies of manufacturers of such equipment."

To carry out this program an Industrial Hygiene Codes Committee was organized which, operating through the Safety and Hygiene Section of the AFA, instituted work on a number of codes in accordance with the objectives set up by the Board of Directors.

One of these codes, completed by the committee and approved by the Board of Directors of the AFA in 1936, was the Tentative Code of Recommended Practices for Grinding, Polishing, and Buffing Equipment Sanitation.

At about the time this work was started, the ASA committee on the Safety Code for Exhaust Systems (Z9) decided to prepare standards covering grinding, buffing, and polishing, for use in

all industries where such equipment was in operation. Representatives of the American Foundrymen's Association on the ASA committee called attention to the fact that such a code was already under development, and in order to avoid duplication of effort suggested to the sectional committee that activity on this subject be deferred pending completion of the AFA code. The ASA committee agreed to this suggestion with the understanding that the code being prepared by the American Foundrymen's Association would be submitted for approval as an American Standard.

Receives Wide Circulation

Following completion of the document, the AFA not only distributed copies to the members of the foundry industry but also widely circulated the code among interested organizations and individuals throughout the United States. It was also brought to the attention of the regulatory bodies of several states, which adopted it as the basis of their own requirements.

The favorable reception given the code by these organizations caused the American Foundrymen's Association to submit it to the American Standards Association for approval as an American Standard. This action was recently completed. The American Foundrymen's Association has thus made a contribution to the group of standards generally available for the use of American industry.

It had been the intention of the American Foundrymen's Association, when submitting its code to the ASA, that the scope be made applicable to all industries using grinding, buffing, and polishing equipment. Consideration of the code by the members of the exhaust systems committee, and later by the Safety Code Correlating Committee, indicated the desirability of limiting the scope to the grinding, buffing, and polishing of ferrous and non-ferrous metals. The committees considered the fact that the type of equipment covered by the code is being used today to grind, polish, and buff various kinds of substances besides metals, about which little is known as to possible toxic properties. It was therefore believed unwise to indicate that the engineering principles set forth in the standard were adequate for all types of materials.

The standard prescribes that in any industry where grinding, polishing, buffing, scratch buffing, or abrasive cutting-off wheels, grinding and polishing straps, or belts are used for the purpose of grinding, polishing, or buffing ferrous and nonferrous metals, there shall be provided hoods

Courtesy Norton Co.

These swing frame machines on which workers are grinding billets are connected to exhaust systems. Note clearness of atmosphere during grinding

connected to exhaust systems which will remove toxic or deleterious substances. It further prescribes that such exhaust systems shall be operated continuously during any of the operations enumerated, and that the exhaust systems shall be provided with dust arresters, collectors, or precipitators to collect the dust or dirt before the air or gases from such exhaust systems are discharged out of doors.

A number of exceptions to the general requirements are given; as, for instance, if an industry employs grinding machines upon which a liquid is used at the area of grinding contact to prevent the escape of dust or particles given off by the operations. An exception is provided where intricate and precision grinding of parts is carried on, or where the grinding pencils, discs, or wheels are not over one inch in outside diameter. Portable polishers and grinders are also excepted. These are a few of the several exceptions specified by the committee which prepared the standard, in order that there would be no misunderstanding as to its applicability in such special cases.

All of the specifications for exhaust systems which have been prepared by numerous organizations in recent years have included detailed construction requirements for hoods and branch pipes. This new American Standard is no exception to this rule, and it may therefore be said that in many ways this standard on a particular subject presents some standard construction requirements which will be of value to other fields of activity.

Methods of testing the exhaust systems, and of collecting the dust and dirt carried by such systems, are prescribed.

In discussing the design of hoods the standard calls attention to the American Standard Safety Code for the Use, Care and Protection of Abrasive Wheels (B7-1935) and also reproduces a number of illustrations from that standard which show the maximum openings in hoods for wheel exposures. In this case the requirements of the two codes have been coordinated to present uniform specifications as far as the use of grinding wheels is concerned.

Courtesy Norton Co.

Floor stand grinding machine guarded with protection hood connected to exhaust system

Special requirements for wing frame grinders, portable grinders, polishing and buffing hoods, cradle grinding and polishing operations, horizontal single spindle disc grinders, horizontal double spindle disc grinders, vertical spindle disc grinders, and grinding and polishing straps and belts are given. Recommended methods of putting special requirements into effect, are extensively illustrated.

In presenting this new American Standard for the use of industry the American Standards Association joins with the American Foundrymen's Association in asking that users send to either organization reports of their experiences and the results obtained from application of the principles and requirements set forth in the standard. It is not intended that any such standards remain static but rather that they shall be improved from time to time in the light of advancing technical knowledge and practical experience.

Revised T-Slot Standard Changes Minus Tolerance to Plus

A revision of the American Tentative Standard, T-Slots, Their Bolts, Nuts, Tongues, and Cutters (formerly B5a-1927) was approved recently as American Standard (B5.1-1941) by the American Standards Association.

In addition to giving the former tentative standard the status of American Standard, the revision makes a change in th direction of the tolerance specified on the width of throat when tongues or other parts must fit. In the original edition a tolerance of *minus* 0.001 in. was specified in the width of throat while the new edition specifies a *plus* tolerance of the same amount.

The standard was developed by a sectional committee working under the sponsorship of the American Society of Mechanical Engineers, the National Machine Tool Builders' Association, and the Society of Automotive Engineers.

Copies are available from the American Standards Association at 35 cents.

ASA Safety Code Committee Re-elects Paine and Smith

THE Safety Code Correlating Committee, in charge of all work on safety standards under the procedure of the American Standards Association, held its annual meeting last month, reviewed the progress of the projects under its jurisdiction (see pages 235 to 246), and elected officers for the coming year. All officers and members of the Executive Committee were re-elected.

Walter S. Paine, manager of the Engineering and Inspection Department, Aetna Casualty & Surety Company, representing the National Conservation Bureau, continues as chairman. Mr. Paine has been a member of the committee since 1937. He served as vice-chairman in 1939 and was elected chairman in 1940. Mr. Paine is prominent in safety work as the author of a Handbook of Industrial Safety Standards, and author of articles on accident prevention, in addition to his safety work in his company.

W. R. Smith, safety engineer of the Public Service Electric and Gas Company, Newark, New Jersey, representative of the Electric Light and Power Group on the SCCC, was re-elected vice-chairman. He has also served prominently in national safety work, as chairman of the Accident Prevention Committee of the Edison Electric Institute, as a member of the Committee on Safety of the American Institute of Electrical Engineers, and as chairman of the National Committee on Co-operation with Engineering Societies of the American Society of Safety Engineers—Engineering Section, National Safety Council.

Members of the Executive Committee of the SCCC, also re-elected, are:

J. P. Craugh, Board of Standards and Appeals, New York Department of Labor, Albany, N. Y., representing the International Association of Industrial Accident Boards and Commissions.

C. E. Pettibone, vice-president, American Mutual Liability Insurance Company, Boston, Massachusetts, representing the National Association of Mutual Casualty Companies.

H. L. Miner, E. I. duPont de Nemours & Company, Wilmington, Delaware, representing the National Fire Protection Association.

L. F. Adams, General Electric Company, Schenectady, New York, representing the National Electrical Manufacturers Association.

W. T. Cameron, chief safety adviser, Division of Labor Standards, United States Department of Labor, representing the Division of Labor Standards.

Cyril Ainsworth, assistant secretary of the American Standards Association, serves as secretary of the committee.

Coordinate Provisions of American and Canadian Wood Pole Standards

Another step in coordination of Canadian and American standards was taken by the Canadian Engineering Standards Association recently when it based its dimensions of Eastern White Cedar Poles and Western Red Cedar Poles on similar specifications approved by the American Standards Association. These two standards are part of a series of standards for wood poles completed recently by the CESA. The general plan followed, as in the case of the American Standards, has been to adopt such dimensions that different species of wood poles can be directly considered on a parallel basis for engineering or purchasing requirements.

Two other wood pole standards completed recently by the CESA cover Red, Jack and Lodgepole Pine Timber for Poles and Reinforcing Stubs, and Cresote Preservative Treatment of Red, Jack and Lodgepole Pine Poles and Reinforcing Stubs by Pressure Process.

Wood pole standards revised recently under the procedure of the American Standards Association to include both specifications and dimensions cover American Standards for Northen White Cedar Poles; Western Red Cedar Poles; Chestnut Poles; Southern Pine Poles; Lodgepole Pine Poles; and Douglas Fir Poles.

Final Date for Proposed Changes In National Electrical Code

The committee which is working on the next revision of the National Electrical Code has set December 15, 1941, as the final date to receive proposals for changes to be included in the 1943 edition of the Code.

Proposed changes should be submitted in writing to A. R. Small, chairman, Electrical Committee, National Fire Protection Association, 207 E. Ohio Street, Chicago, Illinois.

American Safety Standards Aid In Nation's Safety Drive

FOLLOWING a request from the National Safety Council, the American Standards Association is placing the full weight of its experience in safety work behind President Roosevelt's campaign against industrial accidents.

In the past few months the national accident rate has risen alarmingly, interfering with the top-speed production necessary to our defense operations. Newly released statistics by the National Safety Council show that industrial accident deaths were 10 per cent higher for the year ending July 1, 1941, than in the previous year. Safety men interpret this as arising largely from the flood of inexperienced workers into defense jobs and also to the increased pressure of production schedules which is making speed more important at the moment than safety. The greatest rise in the accident rate has come in the defense industries—machine tools, steel, shipbuilding, chemicals, etc. For example, steel injury rates are now up 12 per cent in frequency and 8 per cent in severity.

Ask All Groups to Help Prevent Accidents

Growing alarmed at this increase in accidents which is robbing industry of workers at a time when the loss of a single skilled man is critical, President Roosevelt has asked all groups to join in a defense against accidents. The American Standards Association is in a particularly effective position to help. It already has a comprehensive safety program through which more than 60 safety standards have been completed and are in wide use throughout industry. These safety standards are also furnishing the backbone of state industrial regulations and of insurance company recommendations to their assured. They have been an important factor in the steady decrease in industrial accidents in the years before 1940.

As an aid to the contemplated safety drive, the American Standards Association offers these completed standards as basic information for the removal of accident hazards. It also offers the "going-concern" value of its present safety program, its experience, and its contacts with the many insurance, governmental, industrial, and other groups who have a stake in this safety work.

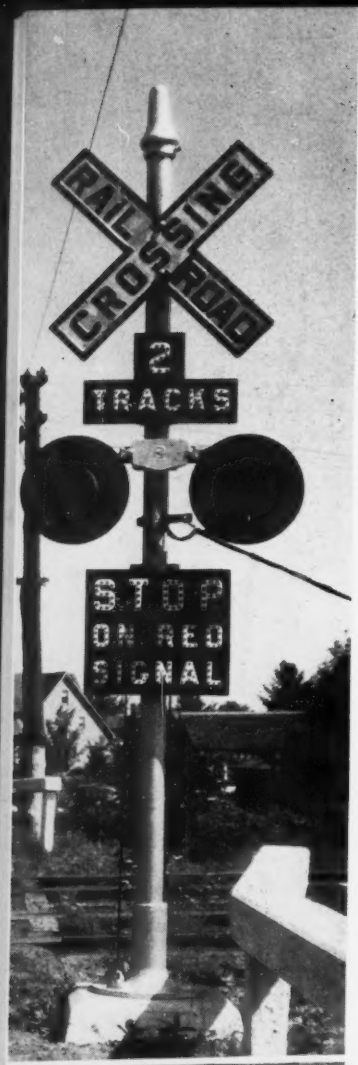
At the present time all safety work of the American Standards Association is under the supervision of a widely representative committee, listed on page 246. The bulk of this work includes standards in the field of industrial safety —guards for machinery, methods of safe operation, etc. There is also a group of standards in the traffic field developed to cut the toll of accidents on our highways and at grade crossings. Standards are also being developed for the safe construction and operation of buildings.

Recently, the Association has been asked to develop standards in the field of industrial hygiene—that is, standards to ensure healthful working conditions. Four standards setting safe limits for the presence of toxic substances breathed by workers have already been completed. These are all for substances widely used in industry or created through industrial processes and which are today constituting a real health hazard to many thousands of workers.

Emergency Health Standards Being Developed

In line with the defense efforts of the country, the American Standards Association has recently adopted an Emergency Procedure for rushing through standardization projects important to defense production. A whole series of the industrial health standards are being developed by this method to help protect the workers filling defense orders.

Following is a complete list of American Standards in the safety field and also a list of safety projects in the process of development under the procedure of the American Standards Association.



Approved American Safety Standards

A2-1934 Specifications for Fire Tests of Building Construction and Materials (ASTM C19-33) *Am. Std* 25c

These specifications cover the performance of walls, columns, floors, and other building parts under fire exposure. Practically any building material may be rated "½ hour", "1 hour", "2 hours", 6 hours", "8 hours", etc. by the careful and precise application of the controlled fire test detailed.

The standard describes the selection of test samples, the conditions of fire exposure, the nature and force of the cooling hose stream, and other details of testing equipment. Exact conditions of acceptance are established for various types of materials.

A9-1940 Building Exits Code *Am. Std* 75c

This standard specifies the number, size, and position of exit facilities sufficient to empty buildings promptly in case of fire or other emergency, and considers those features of construction and protection bearing on safety of egress. It applies to new and to existing construction.

Detailed requirements are given for stairs, stairways, fire escapes, ramps, doors, aisles, and corridors, horizontal exits (bridges to other buildings), elevators, escalators, and slide fire escapes.

One section covers occupancy egress, classifying occupancy as of low, moderate, and high hazard, with illustrative examples for each. The number of persons per unit of exit width is given for various types of hazards, and in relation to sprinkler installation. Schools, department stores, factories, hospitals, hotels, apartment houses and places of public assembly are treated separately and in full detail. For example, a formula is given for computing the necessary exits from an auditorium.

A10.1-1939 Manual of Accident Prevention in Construction *Am. Rec Practice* $2.00

The *Manual of Accident Prevention in Construction* was prepared under the supervision of the Accident Prevention Commitee of the Associated General Contractors of America. The preface, foreword, and introduction discuss the need for accident prevention practices in the construction industry, accident records, effect of safety on morale, insurance and rates, and savings due to accident prevention measures.

About fifty pages are devoted to a scheme of organization which embodies numerous suggested details for a safety program.

The body of the *Manual* covers safe practices in construction work with sections on 43 different phases.

A11-1930 Code of Lighting Factories, Mills and Other Work Places *Am. Std* (*Under Revision*) *Out of Print*

This standard is now being revised under supervision of the Illuminating Engineering Society. Its purpose is to guide factory owners' and operators' efforts to improve lighting conditions, by defining varying light qualities, their effects and control; recommending illumination levels for specific operations, etc.

A12-1932 Safety Code for Floor and Wall Openings, Railings and Toe Boards *Am. Std* 20c

Definite requirements for guarding floor openings, such as stairways, ladderways, hatchways and chutes, skylights, pits and trap-doors, manholes, temporary floor openings; and rules for guarding wall openings such as yard-arm doorways, doorways without yard-arms, chutes, windows, and wall holes are provided in this standard. Temporary wall openings are included.

Specifications are given for a standard railing; a stair railing; strength of standard railings and stair railings of different types of construction, such as wood, pipe, and structural metal; and anchored posts and framing members for railings of all types. Toe boards, floor opening covers and their supports, skylight screens, and wall opening barriers, grab handles, and screens are also covered.

A13-1928 Scheme for the Identification of Piping Systems *Am. Rec Practice* 50c

This standard was developed to provide industrial and power plants with a uniform color scheme for identification of piping systems, so that the markings showing which pipes contain materials safe to handle, and which contain unsafe materials might be generally consistent.

The main part of the code defines piping systems; dangerous, safe, protective,

American Standard signs insure safer motoring (top). Below, example of extensive testing done as part of ASA work on standard for safety glass. Photos Courtesy Assn of American Railroads and Electrical Testing Laboratories

and extra valuable materials. It provides for identification of piping by color; and gives detailed instructions for working out a standard identification scheme.

Appendix A includes a classification of materials carried in pipes; Appendix B, identification by colors; Appendix C, description of colors for special application; and Appendix D, identification of piping systems by legends.

A14-1935 Safety Code for Construction, Care and Use of Ladders *Am. Std (Under Revision)* 25c

This standard defines the following types of ladders: fixed, portable, single, extension, fire, step, trolley, side-rolling, sectional, trestle, extension, mine shaft, and mine ladderway.

One section discusses materials, timber defects, wood side rails, knots, pitch pockets, etc., and includes a classification of woods for use in ladders and requirements for wood steps. Specifications for metal parts, side rails and steps are given.

Rules for the construction of various types of ladders are included; as well as requirements for the installation of fixed ladders, covering such problems as clearances, fastenings, pitch, and maintenance.

Accessories, including cages, rest platforms, landing extensions, landing platforms, non-slip bases, and hooks are covered, and the proper care and use of ladders is described.

A17.1-1937 Safety Code for Elevators, Dumbwaiters and Escalators *Am. Std* $1.00

The seven parts of this standard include requirements for hoistway construction for passenger and freight elevators and for dumbwaiters; power passenger elevators; power freight elevators; hand elevators; escalators; dumbwaiters; and rules for inspection, maintenance and operation. Each part is divided into sections which provide detailed requirements for the various elevator parts, equipment, and safety devices.

A17.2-1937 Recommended Practice for the Inspection of Elevators *Am. Rec Practice* 75c

This handbook is intended to serve as a guide for the general use of elevator inspectors in the practical application of the American Standard Safety Code for Elevators, Dumbwaiters and Escalators.

A23-1938 Standards of School Lighting *Am. Rec Practice* 25c

The primary purpose of this standard is to establish criteria of good illumination for the guidance of architects, engineers, school officials, and others interested in the conservation of children's vision and the well-being and efficiency of pupils and teachers.

Recommended values of illumination are given for different types of school rooms. Distribution and diffusion of light, glare, color of ceiling and walls, and maintenance of proper and adequate equipment for both natural and artificial lighting are discussed.

A39-1933 Safety Code for Window Cleaning *Am. Rec Practice* 20c

The provisions of this standard specify when approved safety devices shall be used in window cleaning and when alterations shall not be allowed. Specifications are set forth for swinging scaffolds, boatswain's chairs and portable and sectional ladders used in connection with window cleaning operations.

Materials for belts, belt terminals, and anchors are specified in connection with rules for their design. Rules are also given for the height of belt fastenings, methods of fastening anchors, and the installation of special anchors for extra-width windows, Anchor fittings are specified for casement windows which cannot be wholly cleaned from the inside.

B7-1935 Safety Code for the Use, Care, and Protection of Abrasive Wheels *Am. Std* 10c

Rules and specifications to insure safety in the use of abrasive wheels operating at peripheral speeds exceeding 2,000 feet per minute are given in this code. Definitions for abrasive wheels, cutting wheels, types of hoods, flanges, adaptors, sleeves, protection bands and chucks, and precision grinding are included. Rules cover provision for storage, inspection, mounting and operation of wheels, and include diagrams and specific requirements for the various types of hoods.

The standard contains tables showing the size of spindles for wheels of various diameters and thicknesses operating at speeds up to 7,000 peripheral feet per minute; materials suitable for use for grinding wheels; minimum sizes and spacing of rivets, bolts and studs; and minimum diameters for pipes for the exhaust of dust when dry grinding operations are carried on. Regulations for flanges cover details of material and dimensions, and those for holes include tables for boring.

Three tables show the relation of types of wheels to permissible maximum speeds, varying up to 16,000 surface feet per minute for wheels 16 inches in diameter and smaller. The relation between revolutions per minute and peripheral speed with reference to diameter of wheel is shown.

B8-1932 Safety Code for the Protection of Industrial Workers in Foundries *Am. Std* 20c

This standard covers requirements for plant layout, including protection of entrances, floors, pits, galleries, gangways, and aisles. A section on machines deals with the safe operation of cupolas, open

Safety on the highway, in construction work, and guards for dangerous machinery (such as abrasive wheels) are important phases of the ASA safety program. Photos Courtesy Brown Bros, Times-Wide World, and Norton Co.

hearth furnaces, charging machines, buggies, cars, or boxes, and electric melting furnaces.

Requirements for safety devices are specified for such equipment as lip-pouring ladles; crane, truck, and trolley ladles; single shank ladles; crown plate of furnaces; sand buckets; sling beams; trunnions on flasks; slings; cranes; air and electric hoists; gears, pinions, etc.; molding machines; sand bins; scrap breakers; the use of explosives and drop balls; stacking of flasks, materials, and equipment; and pilot lights on ladle driers and heaters.

Rules for finishing and cleaning processes are given, and regulations for light, heat, and ventilation of work places are specified. Daily inspection and maintenance of equipment is provided for in the code. Definite requirements are set forth for the protective devices worn by workers. An appendix to the code discusses safety suggestions covering operating conditions in foundries.

B9-1939 Safety Code for Mechanical Refrigeration *Am. Std* 30c

The installation, operation and maintenance of various types of refrigerating systems are covered by this standard.

Systems are classified by type according to their methods of extracting heat. Various classifications of building occupancy are defined; and installation rules for the various types of systems are established on the basis of institutional, public assembly, residential, commercial and industrial occupancy. Tables show the maximum quantities of various refrigerants in relation to the volume of space.

Requirements for piping, valves, fittings and related parts; and design, construction, and safety devices are detailed. Tables covering the Discharge Capacity of Rupture Members and Discharge Piping in Pounds of Air per Minute, and Test Pressures, are included. General safety instructions deal with signs and markings, helmets, and the storing, charging and discharging of refrigerants.

B11-1937 Safety Code for Power Presses and Foot and Hand Presses *Am. Std* 50c

This standard treats of the general hazards, and methods of safeguarding machines fitted with rams (plungers) and dies, such as power presses, foot presses, and hand presses, used for the purpose of blanking, trimming, drawing, punching, or stamping material. It covers plate shears and plate punches.

Many illustrations show the types of machines and safety devices.

B13-1924 Logging and Sawmill Safety Code *Am. Tent. Std (Under Revision) Out of Print*

Rules for logging operations embrace the complete process, from felling the trees through their course to skid piles, loading, and shipment by rail or river to sawmills.

Such matters as mill design and layout; handling logs in the mill; guarding and operating machinery; waste disposal; power and power transmission, are covered.

B15-1927 Safety Code for Mechanical Power-Transmission Apparatus *Am. Std (Under Revision)* 35c

Specifications for guarding flywheels, cranks, and connecting rods, tail rods or extension piston rods, and governor balls on prime movers such as steam, gas, oil, and air engines, motors, steam and hydraulic turbines are given in this standard. It also contains requirements for guarding, installing, and locating such equipment as shafting, pulleys, belts, ropes, chain drives, gears, sprockets, chains, friction drives, keys, set screws, collars and couplings, bearings, and facilities for oiling.

Equipment for guarding clutches, cut-off couplings, clutch pulleys, belt shifters, shippers, poles, perches, and fasteners is specified. Types of guards are shown in two pages of sketches. Materials, design, and method of manufacture are given for a number of various types of guards. The final sections deal with various types of equipment and operating rules, and refer to safety codes on related subjects.

B19-1938 Safety Code for Compressed Air Machinery and Equipment *Am. Std* 30c

This standard applies to compressed air machinery and equipment such as air compressors of the positive displacement type, air receivers, piping systems, pneumatic hammers, pneumatic drills, and other equipment used in providing and utilizing compressed air for performing operations such as cleaning, drilling, hoisting and chipping. The code does not, however, deal with special problems created through use of compressed air to convey materials, or in tunnel and caisson work. Neither is it intended to apply to such machinery and equipment when used on transportation vehicles such as steam railroad cars, electric railway and automotive equipment.

B24-1927 Safety Code for Forging and Hot Metal Stamping. *Am. Tent. Std (Under Revision)* 15c

This standard covers safety requirements for all classes of power-forging machinery for both drop forging and flat-pile forging. It includes steam, pneumatic, and mechanically operated hammers, hydraulic presses, trimming presses, bulldozers, upsetting machines, bolt-heading and rivert-making machines, and hot saws. It also gives requirements for incidental operations in connection with such machinery. Illustrated descriptions show how various manufacturers have met certain code requirements. A number of operating rules for use in plants are included.

Safety standards for machine tools, and for exhaust systems, are now being prepared. Headlight requirements are specified in Colors for Traffic Signals. Photos Courtesy Norton Co., RCA Mfg Co., Brown Bros.

B28a-1927 Safety Code for Rubber Mills and Calendars *Am. Rec Practice* 5c

Safeguarding of mills and calenders at the point of operation including safety-trip controls and quick-stop facilities, determination of distance of travel, stopping limits for individually driven mills, mills driven in groups, and individually and group-driven calenders is covered by this standard. Various requirements are illustrated. Operating rules are given together with a discussion of accident prevention in connection with such operations.

C1-1940 Regulations for Electric Wiring and Apparatus in Relation to Fire Hazard (National Electrical Code) *Am. Std* 5c

Detailed requirements for the installation of electrical wiring and equipment for lighting, heating, and power are covered chiefly from the point of view of the fire hazard presented by such installations. Signalling systems are also covered in so far as they may involve such hazards. The standard covers certain features of the casualty hazard in numerous iastances, but from this standpoint, it should be considered in connection with the National Electrical Safety Code.

C2 National Electrical Safety Code. *Am. Std*

The five parts of this code are:

Part I, C2.1-1941—Rules for the Installation and Maintenance of Electrical Supply Stations (10c)

Part II, C2.2-1941—Rules for the Installation and Maintenance of Overhead and Underground Electrical Supply and Communication Lines *In Press*

Part III, C2.3-1941—Rules for the Installation and Maintenance of Electrical Utilization Equipment (15c)

Part IV, C2.4-1939—Rules for the Operation of Electrical Equipment and Lines (10c)

Part V, C2.5-1940—Rules for Radio Installations (10c).

The purpose of this standard is to provide rules and regulations which will insure the safe operation of electrical lines and equipment. The terms used are defined and rules covering methods of protective grounding are given special treatment.

The standard should be considered in connection with the National Electrical Code.

It is expected that a discussion of this standard will be made available later. This discussion will contain the material formerly contained in appendices giving data on conductors and supporting structures, etc., and will outline in considerable detail the principles on which the standard is based.

C5 Code for Protection Against Lightning 15c

Assembled in one phamphlet, this code is divided into three parts:

Part I, C5.1-1937—Protection of Persons *Am. Std.*

Part II, C5.2-1937—Protection of Buildings and Miscellaneous Property *Am. Std.*

Part III, C5.3-1937—Protection of Structures Containing Inflammable Liquids and Gases *Am. Tent. Std. (Under Revision)*

The first two sections were revised in 1937.

A number of rules for personal conduct as a protection against lightning are given. In the section on lightning protection for ordinary buildings, requirements are included for conductors, points, and elevation rods, prevention of deterioration, air terminals and conductors, metal-roofed and metal-clad buildings, number of down conductors, interconnection of metallic masses, ground connections and radio installations and wires entering buildings. Similar requirements are given for miscellaneous structures, buildings containing baled flammable materials, buildings of nonconducting materials, smokestacks and chimneys, metal smokestacks, various types of stacks, hangars for balloons and airships, ships, trees, and livestock in fields. Protective measures and precautions are set forth for structures containing inflammable liquids and gases.

Appendix A contains a discussion of lightning, its origin, characteristics, and effects. Appendix B gives a bibliography on the subject.

D3-1927 Colors for Traffic Signals *Am. Std* 25c

This standard provides a system of colors for vehicle lights and signals and includes specifications for headlights, tail lights, warning signal lights, and marker lights. The general significance of colors, form, and flashing signals in connection with highway traffic is specified.

Requirements for signals at railroad grade crossings are given. Rules for qualitative definition of red, yellow, and green colors for luminous signals are included as well as for the dominant wave-length, purity, and integral transmission of glass.

D6-1935 Manual on Uniform Traffic Control Devices for Streets and Highways *Am. Std* 50c

This standard was prepared by a Joint Committee on Uniform Traffic Control Devices appointed by the American Association of State Highway Officials and the National Conference on Street and Highway Safety. It was later submitted to and approved by the American Standards Association.

Heads and eyes of workers are protected in many hazardous occupations. American Standard safety requirements for window cleaning help prevent accidents. Three standards provide protection against lightning. Photos Courtesy Lincoln Electric Co., Empire State Bldg, General Electric Co.

The four main sections of this standard cover signs, markings (regulatory, guidance, and warning), signals (traffic control and flashing), and islands (safety zones and traffic islands). Regulations are given covering legal authority; correct and consistent application; shape, color, materials, dimensions, message, etc. of the design; location and installation, and maintenance. There are 18 pages of illustrations of the requirements and five appendices giving special information.

D7.1-1941 Inspection Requirements for Motor Vehicles. *Am. Std* 25c

This standard represents minimum requirements for the mechanical condition of vehicles for safe operation on highways. It covers the entire lighting system; tires, wheels and wheel alignment; accessories; and various miscellaneous equipment which include in part windshield and other glass, fuel tanks and lines, directional signals, trailer mounting, coupling and wiring, and body fittings. It does not include minimum requirements for brakes. Special research is being carried on in order to obtain the necessary technical information on which to base brake requirements.

D8-1937 Standard for Railroad Highway Grade Crossing Protection *Am. Std (Under Revision)* 10c

Uniform practice in protecting highway grade crossings is the goal of this standard, developed by the Joint Committee on Grade Crossing Protection, Association of American Railroads. Drawings show exact arrangement, dimensions, and other details for each type of sign or device considered. The length of time that bells, lights, etc., must operate when a train is approaching is specified.

K2-1927 Gas Safety Code for Installations and Work in Buildings *Am. Std* 20c

This standard is divided into two parts: first, mandatory rules which must be followed to attain the greatest measure of safety; second, notes which describe in simple language the dangers to be guarded against.

K13-1930 Code for Identification of Gas-Mask Canisters *Am. Rec Practice* 5c

Colors to identify gas-mask canisters (containing filtering or absorbing materials for protection against harmful gases, vapors, smokes, and mists) are assigned in this standard for each type of harmful gas.

The purpose is to identify gas-mask canisters so clearly that no misunderstanding can arise in selecting the correct canister for the danger to be encountered.

L1-1929 Textile Safety Code *Am. Std (Under Revision)* 5c

These requirements apply to all plants operating textile machinery and cover equipment, such as pickers, cards, combing machinery, drawing frames, slubbers, roving frames, ring spinning frames, spinning mules, sewing machines, washing machines, mangles, jigs and vats, color mixers, calenders, extractors, and other machinery and equipment used for similar purposes.

M2-1926 Safety Rules for Installing and Using Electrical Equipment in Coal Mines *Am. Std (Under Revision) Out of Print*

The installation and use of electrical equipment underground in coal mines is covered in this standard. From one point of view the code is supplementary to the National Electrical Code and the National Electrical Safety Code, which cover aboveground installations.

General definitions, rules, and requirements are contained in the code, together with specific information on voltages, capacity and rating of conductors, and rules for the prevention of accidents and fires.

Divisions of the code cover stationary electrical equipment, buildings, enclosures, portable electrical equipment, and circuits and conductors.

M10-1928 Miscellaneous Outside Coal Handling Equipment *Am. Tent. Std (Under Revision) Out of Print*

This standard provides a system for hoisting and lowering signals. Specific requirements for devices used in hauling men on inclines, for hoisting and lowering men in shafts, and special rules to increase safety around the tipple are included.

Fire protection is covered by a section of the standard and attention is called to the American Standard Screw Threads for Fire Hose Couplings for use on all fire-fighting equipment.

A special table shows sizes of pulley end shafts of stationary induction motors recommended for horsepower equipment from 5 to 200 classified by revolutions per minute from 600 to 1800.

M11-1927 Wire Rope for Mines *Am. Tent. Std (Under Revision)* 25c

The provisions of this standard are essentially detailed requirements for various types of wire rope and cable intended for use in mining operations to insure adequate capacity and safety in new installations. Recommendations for installing rope are also given together with suggested practices for splicing and the attachment of clasps and clamps. Some discussion is also given of desirable practices for the maintenance and inspection of wire ropes and cables in service.

A badly lighted shop (top) and two examples of good lighting, important in safety, are shown here. Photos Courtesy General Electric Co. and Illuminating Engineering Society

M12-1928 Standard for Construction and Maintenance of Ladders and Stairs for Mines *Am. Tent. Std (Under Revision)* 25c

Requirements for the location and construction of platforms, installation of lights, power wires, and other safety equipment for mine ladderways are provided. Specifications for mine ladders and mine stairs are given, including dimensions of stairs, risers and treads; and handrails for stairs. Specifications are also given for mine shaft ladders, cages, landing extensions, and breaks.

M13-1925 Recommended Practice for Rock Dusting Coal Mines to Prevent Coal Dust Explosions *Am. Rec Practice* 25c

This standard was reviewed in 1941 and re-affirmed because the provisions were found to be in accord with good mining practice.

The types and parts of mines which should be rock dusted are specified, with regulations covering the kind, size, and amount of dust to be used. Methods are given for sampling the dust and keeping records of the samplings.

M14-1930 Recommended Practice for the Use of Explosives in Bituminous Coal Mines *Am. Rec Practice* 25c

This standard discusses the suitability of types of explosives and appliances for use in bituminous coal mines; handling and storing explosives on the surface; transportation, handling, and storage underground; and methods and precautions for charging and firing, including inspection.

The use of particular explosives, such as dynamite, is required to be approved by the U. S. Bureau of Mines.

M15-1931 Recommended Practice for Coal Mine Transportation *Am. Rec Practice* 20c

The first part of the standard contains rules for the installation of tracks, bonding of tracks, the use of stopblocks and derails on grades in room entries, switches, derailers on slopes, clearances of working places, signals, doors, slope hoists, shaft hoist and cars.

The second part is devoted to operation and covers blocks and derailers, switching in room necks, make-up trips, endless ropes or chains, signal system, duties of footman or rope rider, system of signals for hoisting and lowering, locomotives, locomotive signals, trip riders, cars and hoists. Special provisions cover hauling explosives.

Rules for inspection of equipment are included.

M17-1930 Recommended Practice for Fire Fighting Equipment in Metal Mines (mimeographed) *Am. Rec Practice No Charge*

Specifications for fire-fighting equipment, such as surface and underground water supply and hose equipment, fire extinguishers and fire pails, spraying or sprinkling systems, and oxygen breathing apparatus are given. Fire preventive measures covering ventilation and ventilation equipment, explosives, and electrical equipment are included. Fire signals are provided for, together with requirements for fire-fighting personnel and miscellaneous preventive measures to be taken.

M24-1932 Rules for Installing and Using Electrical Equipment in Metal Mines (mimeographed) *Am. Rec Practice No Charge*

This standard presents recommended practices to minimize hazards in the installation and operation of electrical equipment in underground mining work. To insure safety in surface work around mines reference is made to the National Electrical Code and the National Electrical Safety Code, both also approved by the ASA.

Sections of the standard include pertinent definitions; directions for supervision, inspection and control; limitation of voltages; and proper housing and guarding in stationary, portable and haulage equipment using electricity.

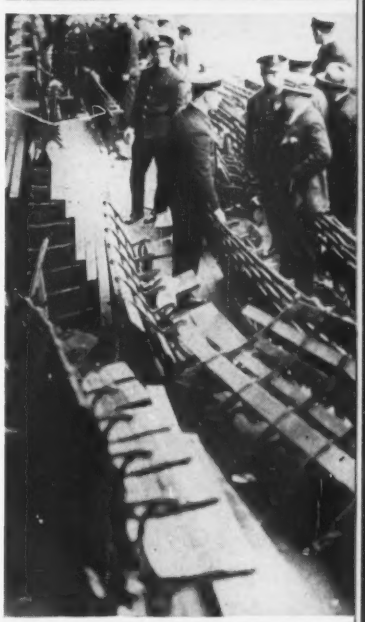
O1-1930 Safety Code for Woodworking Plants *Am. Std (Under Revision)* *Out of Print*

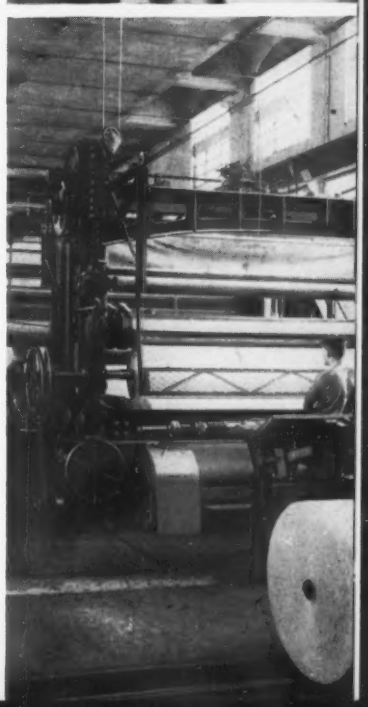
Requirements for the safe operation and maintenance of woodworking machinery, including cooperage and making of veneer, are provided. The standard deals primarily with point of operation hazards on woodworking machinery and gives detailed requirements for guarding all types of saws, wood shapers, and similar equipment used in such operations. Rules for plant layout are included, as well as a section on operating rules and a discussion of various practices to promote safe operation.

P1-1936 Safety Code for Paper and Pulp Mills *Am. Tent. Std* 25c

Rules covering the handling and storage of pulp wood and other materials in the yard and from ships, the removal and conveying of such materials, and protective measures to be employed by workers are outlined. A section on preparing pulp wood gives rules for guarding saws, slasher tables, drive belts, pulleys and shafts, the runway to the jack ladder, etc. The code prescribes guards for hand barkers, barking drums, splitters and chippers.

Detailed requirements are included for rag and old paper preparations, chemical processes of making pulp, bleaching, mechanical pulp processes, stock preparation, and machine and finishing room practices.





High speeds in cutting stone are permitted with American Standard guards (above). New standard gives safety requirements for portable grandstands. All paper-making processes are covered by an American Tentative Standard

Z2-1938 Safety Code for the Protection of the Heads and Eyes of Industrial Workers. *Am. Std* 15c

This standard presents requirements for the protection of workers' heads, eyes and respiratory organs from such occupational hazards as gases, dusts, fumes, splashing metals or liquids, glare, injurious radiant energy, falling or flying objects, etc.

The processes necessitating protection are classified in twelve groups according to their distinctive features, and protective devices prescribed on that basis. Various types of goggles, lenses and frames; respirators, filters and valves; masks and headpieces are discussed with relation to their specific purposes, and specifications and methods of test are given in detail.

Z4.1-1935 Safety Code for Industrial Sanitation in Manufacturing Establishments *Am. Std* 20c

These requirements apply to all permanent places of employment in which articles are manufactured, repaired, cleaned, sorted, or renovated, in whole or in part for profit, sale, or compensation. The standard prescribes minimum sanitary requirements for protection of the health of employees in such establishments.

Sections cover application of the rules and specifications for the following: Water supply, lighting, ventilation, housekeeping, expectorating, waste disposal, inspection, miscellaneous requirements, hazardous processes, personal service rooms, toilet facilities, washing facilities, dressing rooms for men, dressing rooms for women, and lunch rooms.

Z4.2-1935 Specifications for Drinking Fountains *Am. Std* (*Under Revision*) 10c

These specifications, based on the requirements contained in Bulletin 87 of the Women's Bureau, U. S. Department of Labor, cover: Material of fountain; material of nozzle; protection of nozzle; bubbler and bowl of fountain; drain from fountain; water supply pipe and valves; height of fountain; waste opening and pipe.

Z4.3-1935 Specifications for the Sanitary Privy *Am. Tent. Std* 10c

These specifications were adopted verbatim from Supplement 108 of the U. S. Public Health Service which covers practical information relative to sanitary privies.

Z8-1924 Safety Code for Laundry Machinery and Operations *Am. Tent. Std* 5c

This standard was reviewed in 1941 and re-affirmed because its provisions were found to meet present-day requirements.

Rules for safety in the operation of all moving parts of equipment used in laundries, as well as provisions for effective guarding of the points of operation of specific laundry machines, are contained in this standard.

Z9 Report Relating to the Design and Operation of Exhaust Systems 40c

This report defines dusts, fumes, mists, vapors, and gases; gives rules for the construction of exhaust hoods; includes a table of minimum air velocities required to capture industrial dusts of several types; and shows the design and installation of exhaust piping. Special sections relate to exhaust fans and to air cleaning plants.

Fundamental concepts and data are assembled and the manner in which these influence design, indicated. The report is intended as a guide to those desiring to install and use exhaust systems as well as to manufacturers and designers of such equipment.

Z9.1-1941 Safety in Electroplating Operations *Am. Std* 30c

This standard applies to electroplating operations which may injure the health of operators through contact with gases, mists, or liquids. The code embraces only electroplating and deplating operations; or the anodizing of metals.

Its purpose is to provide standard exhaust system requirements for electroplating and deplating processes, and to establish uniform regulations for the conduct of such work so as to reduce possible hazards to health. Supplementary recommendations for personal protection appear in an appendix.

Z12-1940 Safety Codes for the Prevention of Dust Explosions *Am. Std* 75c

These eleven standards listed below contain rules for the prevention of dust explosions and provide proper control and prevention measures to reduce losses.

Detailed rules and regulations cover structures and processes, ventilation, electrical equipment and wiring, removal of dust, and plant equipment and operations.

Z12.1-1940 Installation of Pulverized-Fuel Systems

Z12.2-1940 Prevention of Dust Explosions in Starch Factories

Z12.3-1940 Prevention of Dust Explosions in Flour and Feed Mills

Z12.4-1940 Prevention of Dust Explosions in Terminal Grain Elevators

Z12.5-1940 Prevention of Dust Explosions in Woodworking Plants

Z12.6-1940 Installation of Pulverizing Systems for Sugar and Cocoa

Z12.7-1940 Prevention of Dust Explosions in Coal Pneumatic Cleaning Plants

The Manual of Accident Prevention in Construction is widely used. Safety rules tell how to install and use electrical equipment in coal mines. Courtesy Times-Wide World, Sullivan Machinery Co.

Z12.8-1940 Prevention of Dust Explosions in Wood-Flour Manufacturing Establishments

Z12.9-1940 Prevention of Dust Ignition in Spice Grinding Plants

Z12.10-1940 Use of Inert Gas for Fire and Explosion Prevention

Z12.11-1940 Prevention of Dust Explosions in the Manufacture of Aluminum Bronze Powder

Z16.1-1937 Standard Method of Compiling Industrial Injury Rates *Am. Std* 20c

Time charges are set up for six classes of industrial injuries: death, permanent total disability, permanent partial disability, temporary total disability, temporary partial disability, and first aid case. A scale from which time charges may be determined, and rules for computing frequency and severity rates are given. A section on rulings and interpretations is included.

Z16.2-1941 Methods of Compiling Industrial Accident Causes *Am. Rec Practice* $1.00

This standard is intended as a means for the statistical analysis of causes of industrial accidents, for guidance in accident prevention. Its provisions for classifying not only the related object but its physical condition and the precipitating act are proposed to bring out the primary causal factors, an obvious prerequisite to effective measures for prevention.

Z20.1-1941 Specifications for Portable Steel and Wood Grandstands *Am. Std* 60c

This standard sets forth specific requirements for portable grandstands, covering dimensions of seats, back rests, railings and aisles; live loading; horizontal swaying force and wind load; foundations; materials of construction and welding; and allowable stresses for steel and for wood parts.

Z26.1-1938 Safety Code for Safety Glass for Glazing Motor Vehicles Operating on Land Highways *Am. Tent. Std* 20c

The following specific tests for safety glass are given in this code: discoloration, humidity, boiling, ball (impact), short bag (impact), fracture, dart, and visibility distortion. A provision for labeling glass which meets the requirements of this standard is included.

Z33.1-1938 Regulations for the Installation of Blower and Exhaust Systems *Am. Std* 15c

These regulations cover the construction, installation, operation and maintenance of blower and exhaust systems and fans for the removal of dust vapor and refuse, and for air conveying including ducts and related equipment, and the disposal of the materials conveyed, to protect life and property from fire, smoke and gases resulting from fire, or from conditions having manifestations similar to fire.

Z35.1-1941 Specifications for Accident Prevention Signs *Am. Std* 35c

This standard details the best current practice in color, design, application and use of danger, caution, safety instruction, directional and information signs; for which it gives detailed specifications and illustrations. Its primary intent is to establish consistently distinctive sign warnings which will foster maximum safety through workers' automatic and instantaneous reaction to familiar, standard designs and colors.

Z37.1-1941 Allowable Concentration of Carbon Monoxide *Am. Std* 20c

Z37.2-1941 Allowable Concentration of Hydrogen Sulfide *Am. Std* 20c

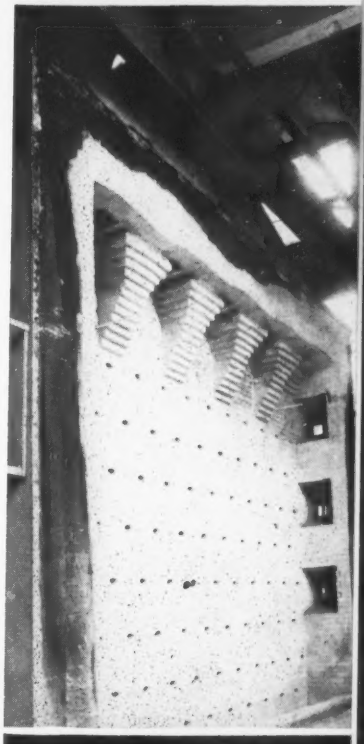
Z37.3-1941 Allowable Concentration of Carbon Disulfide *Am. Std* 20c

Z37.4-1941 Allowable Concentration of Benzene *Am. Std* 20c

Each of these standards establishes the concentration of its subject substance which may be permitted in the atmosphere of working places from the viewpoint of occupational disease prevention. They are intended to serve as guide posts in protecting workers' health; and are further expected to be of aid to engineers in designing methods for control of harmful dusts, fumes and gases. Each standard sets forth the physical and chemical properties of its subject substance, summarizes methods of test, and includes a comprehensive bibliography.

Z43-1941 Grinding, Buffing and Polishing Equipment Sanitation *Am. Std* 60c

This standard sets up specifications for exhaust systems for the removal of toxic or deleterious substances in any industry where grinding, polishing, buffing, scratch buffing or abrasive cutting-off wheels, grinding and polishing straps or belts are used to grind, buff or polish ferrous or nonferrous metals. It contains detailed construction requirements for hoods and branch pipes, and outlines methods of testing exhaust systems and of collecting dirt and dust carried thereby. Certain types of operations are specifically exempted.



Standard inspection rules for motor vehicles, fire tests on building materials (center), and requirements for installation of exhaust systems are now available. Photos Courtesy Charles Phelps Cushing, Nat. Bureau of Standards.

Standards Under Development

(No publications on these subjects are for sale.)

A10 Standards for Safety in the Construction Industry

This project encompasses construction, demolition and repair of buildings in relation to accident hazards to employees and to the public. One standard—*Manual of Accident Prevention in Construction*—has been in use since 1934 and was revised in 1939 (see A10.1-1939, p. 236).

A tentative final draft of the Proposed Safety Code for Construction was recently completed.

A22 Safety Code for Walkway Surfaces

This project deals with general construction and maintenance requirements for walkway surfaces in buildings, covering durability, flammability, insulation around electrical apparatus, and resistance to slipping.

Work on this project is now at a standstill for lack of certain technical data.

A64 Safety Standards for General Industrial Stairs

This standard will cover the safe design and construction of general industrial stairs other than those used exclusively for fire exit purposes, but is not to apply to construction operations or to private residences.

This project was only recently initiated and actual work has not yet begun.

B20 Safety Code for Conveyors and Conveying Machinery

Five subcommittees have been working on various sections of this standard. Their reports have been completed and circulated for comment and criticism.

B30 Safety Code for Cranes, Derricks and Hoists

This standard will provide structural and operating rules for cranes, derricks and hoists, not including apparatus used in mines. A final draft has been approved by the committee for the project and is now being edited for submittal to the ASA.

Under this project a proposed Safety Code for Jacks—B30.1, has been submitted by the sponsors for approval as American Standard.

M27 Use of Explosives in Anthracite Mines

A standard developed by the Mine Inspectors' Institute of America is now being considered for approval by the ASA. This standard provides methods for handling, storing, and transporting; and suggested safe practices for charging and firing in anthracite mines.

M28 Safety in Quarry Operations

A project to unify methods for insuring safe operations in quarries of all types and also in open pit and strip pit mining operations has been authorized. A committee representing all interested groups is now considering a first draft of a proposed standard.

Z5 Ventilation Code

This code will provide standards for air conditions for places of human occupancy where the primary consideration is the control of temperature, humidity, air motion and odors; and also where the primary consideration is the control of air polution or contamination in industrial, manufacturing or construction operations. Work on the standard is progressing.

Z9 Safety Code for Exhaust Systems

This project covers the design, operation and maintenance of equipment to provide a safe atmosphere by removing harmful substances and safe disposal of them. One standard (electroplating, Z9.1-1941) has been approved and others are being considered in the committee.

Z28 Work on Compressed Air

This project will establish construction and operating rules for work under pressure, such as in tunnels and caissons. It will cover necessary instruments and apparatus, locks, mechanical and fire hazards to workers, medical attendance, inspection, air analysis, and temperature control, and other conditions of work.

A tentative final draft is awaiting the inclusion of a section on decompression rates based on data being prepared by the U. S. Navy Department.

Z37 Allowable Concentrations of Toxic Dusts and Gases

Several standards under this project have already been approved and additional substances are under consideration. (See Z37.1-1941—Z37.4-1941.)

Z40 Safety Standards for Household Ladders

This project has not progressed since its initiation, pending completion of the revision of the Safety Code for Construction, Care and Use of Ladders—A14-1935.

Z41 Performance Requirements for Protective Occupational Footwear

Performance requirements and methods of test for protective occupational footwear are to deal with resistance to impact, pressure, puncture, slipping, and special exposures; and to include electrical conductivity.

The sectional committee first met in March, 1941.

Z42 Safety Code for Dry Cleaning Operations

This standard will provide safety provisions with the exception of fire hazards, for equipment used in dry cleaning operations with special reference to mechanical hazards and toxicity of fumes.

A committee of interested groups is being organized.

INDEX

Subjects covered in this review of completed American safety standards and projects under development are indexed in alphabetical order below. The ASA project numbers show the year in which the most recent edition was approved by the American Standards Association. Symbols without dates represent projects still under development.

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  anthracite, explosives in M27*
  bituminous, explosives in M14-1930
  electrical equipment in M2-1926
  rock dusting M13-1925
  transportation M15-1931
Colors for traffic signals D3-1927
Compressed air, work in Z28*
Compressed air machinery and equipment B19-1938
Construction
  accident prevention manual A10.1-1939
  safety in A10*
Conveyors and conveying machinery B20*
Cranes, derricks, hoists B30*

Drinking fountains Z4.2-1935
Dry-cleaning operations Z42*
Dust explosions, prevention
  coal pneumatic cleaning plants Z12.7-1940
  flour and feed mills Z12.3-1940
  manufacture of aluminum bronze powder Z12.11-1940
  starch factories Z12.2-1940
  terminal grain elevators Z12.4-1940
  use of inert gas for prevention Z12.10-1940
  wood flour manufacturing establishments Z12.8-1940
  woodworking plants Z12.5-1940
Dust ignition, prevention, spice grinding plants Z12.9-1940
Dust, toxic—*see* Toxic dusts and gases

Electrical code, National C1-1940
Electrical equipment, installing and using in metal mines M24-1932
Electrical safety code, National
  electrical supply stations C2.1-1941
  overhead and underground electrical supply and communication lines C2.2-1941
  electrical utilization equipment C2.3-1941
  electrical equipment and lines C2.4-1939
  radio installations C2.5-1940
Electroplating Z9.1-1941
Elevators, dumbwaiters and escalators A17.1-1937
  inspection manual A17.2-1937
Exhaust systems Z9*
  design (report) Z9
  electroplating Z9.1-1941
  grinding, buffing, polishing operations Z43-1941

Fire fighting equipment in metal mines M17-1930
Fire and explosion, use of inert gas for prevention Z12.10-1940
Fire tests of building construction and materials A2-1934
Floor and wall openings A12-1932
Footwear Z41*
Forging and hot metal stamping B24-1927
Foundries, protection of workers B8-1932
Fuel systems, pulverized Z12.1-1940

Gas
  safety code K2-1927
  toxic — *see* Toxic dusts and gases
Gas mask canisters, identification K13-1930
Glass, safety, motor vehicle Z26.1-1938
Grade crossing protection, railroad highway D8-1937
Grandstands, portable steel and wood Z20.1-1941
Grinding, buffing and polishing equipment sanitation Z43-1941

Heads and eyes, protection of Z2-1938
Hoists, cranes, derricks B30*
Hydrogen sulfide, allowable concentration of Z37.2-1941

Injury rates, compiling Z16.1-1937

Ladders
  household Z40*
  industrial A14-1935
  mines, for use in M12-1928
Laundry machinery and operations Z8-1924
Lighting
  factories, mills and other work places A11-1930
  schools A23—1938
Lightning, protection against
  buildings and property C5.2-1937
  persons C5.1-1937
  structures containing inflammable liquids and gases C5.3-1937
Logging and sawmills B13-1924

Mines
  ladders and stairs for M12-1928
  wire rope for M11-1927
  see also Coal mines
Mines, metal
  fire fighting equipment in M17-1930

* Work on this project is not yet completed. See Standards Under Development, p. 244.

installing and using electrical equipment in	M24-1932
Motor vehicles, inspection requirements	D7.1-1941
Paper and pulp mills	P1-1936
Piping systems, identification	A13-1928
Power transmission, mechanical	B15-1927
Presses, power, foot and hand	B11-1937
Privy, sanitary	Z4.3-1935
Pulverized fuel systems	Z12.1-1940
Pulverizing systems for sugar and cocoa	Z12.6-1940
Quarry operations	M28*
Railings and toe boards	A12-1932
Railroad, highway, grade crossing protection	D8-1937
Refrigeration, mechanical	B9-1939
Rubber mills and calenders	B28a-1927
Sanitation, industrial	Z4.1-1935
Sawmills, logging and	B13-1924
School lighting	A23-1938
Shoes	Z41*
Signs, accident prevention	Z35.1-1941
Stairs	
general industrial	A64*
mines, for use in	M12-1928
Textiles	L1-1929
Toxic dusts and gases allowable concentrations of	Z37*
benzene	Z37.4-1941
carbon disulfide	Z37.3-1941
carbon monoxide	Z37.1-1941
hydrogen sulfide	Z37.2-1941
Traffic	
automobiles, inspection requirements	D7.1-1941
control devices	D6-1935
railroad, highway, grade crossing protection	D8-1937
safety glass	Z26.1-1938
signals, colors for	D3-1927
Ventilation	Z5*
Walkway surfaces	A22*
Window cleaning	A39-1933
Wire rope for mines	M11-1927
Woodworking plants	O1-1930

* Work on this project is not yet completed. See Standards Under Development, p. 244.

The ASA Safety Code Correlating Committee

The Safety Code Correlating Committee supervises and coordinates all the work on safety standards under the jurisdiction of the American Standards Association. It makes recommendations to the ASA on initiation of new safety projects, on personnel of committees, and on approval of standards. Members of the committee are:

W. S. Paine, National Conservation Bureau, *Chairman*

W. R. Smith, Electric Light and Power Group, *Vice-chairman*

Cyril Ainsworth, American Standards Association, *Secretary*

American Gas Association, *James B. Douglas, C. S. Hazel (alt)*

American Iron and Steel Institute, *Grover C. Brown*

American Petroleum Institute, *H. N. Blakeslee, D. V. Stroop (alt)*

American Society of Mechanical Engineers, *Alexander W. Luce, Arthur E. Windle (alt)*

American Society of Safety Engineers, Engineering Section, National Safety Council, *R. M. Godwin, G. E. Sanford (alt)*

American Transit Association, *J. M. H. Andrews, R. H. Stier (alt)*

Association of American Railroads, *C. E. Hill*

Automobile Manufacturers Association, *David C. Fenner, William J. Cronin (alt)*

Conference of State and Provincial Health Authorities of North America, *Stanley H. Osborn, Albert S. Gray (alt)*

Electric Light and Power Group, *W. R. Smith, A. B. Campbell (alt)*

Industrial Safety Equipment Association, *A. O. Boniface (alt)*

International Association of Governmental Labor Officials, *Harry D. Immel, T. P. Kearns, Thtomas B. Morton (alt)*

International Association of Industrial Accident Boards and Commissions, *E. P. Herges, C. H. Fry (alt), George P. Keogh, H. L. Reid (alt), J. P. Craugh, Charles E. Durr (alt), John Roach, Joseph A. Haller (alt), T. A. Wilson, W. L. Powell (alt)*

National Association of Mutual Casualty Companies, *C. E. Pettibone, S. E. Whiting (alt)*

National Bureau of Standards, U. S. Department of Commerce, *John A. Dickinson*

The National Conservation Bureau, *Walter S. Paine, Elliott P. Knight (alt)*

National Electrical Manufacturer's Association, *L. F. Adams, Frank Thornton, Jr. (alt)*

National Fire Protection Association, *H. L. Miner, C. W. Rulon (alt)*

National Industrial Conference Board, *Charles E. Payne*

National Safety Council, *R. L. Forney, F. W. Braun (alt)*

Telephone Group, *A. B. Brown, E. S. Miner (alt)*

U. S. Department of Labor, *William Green*

U. S. Department of Labor, Bureau of Labor Statistics, *M. D. Kossoris (alt)*

U. S. Department of Labor, Division of Labor Standards, *W. T. Cameron, R. P. Blake (alt)*

U. S. Public Health Service, *P. A. Neal, J. J. Bloomfield (alt)*

OPACS Asks ASA to Start Work On Four Emergency Standards

REQUESTS have been received by the American Standards Association from OPACS that the ASA start work at once on emergency standards for electric household refrigerators, electric flat-irons, domestic washing machines, and definitions for textiles. The purpose of the standards will be to assure the public of the serviceability of the equipment and materials covered in the face of shrinking supplies of raw materials, and also to cut down all unnecessary variety in sizes and styles in order to conserve production facilities.

Will Help Conserve Materials

"Such standards would be of very definite advantage both to the purchasing public and to the industry in meeting the serious dislocations brought about by the exigencies of national defense," declares Miss Harriet Elliott, Associate Administrator of OPACS, in requesting the three projects on refrigerators, flat irons, and washing machines.

"In view of the necessity of conserving materials, and of using substitute materials," she continued, "it is suggested that such a standardization program should include:

"Concentration on a small number of sizes, perhaps but two or three

"Minimum performance requirements for the protection of the purchaser

"Such a standardization program should bring about important economies in production and distribution, and hence result in the production of more refrigerators, flat irons and washing machines and in better service to consumers than would otherwise be possible," she declared.

In addition to the aims of the standardization program outlined above which apply to all three projects, the standards for domestic washing machines should also provide a method of comparing effectiveness, minimum performance standards for both the washer and extractor, and minimum construction standards, Miss Elliott's letter stated.

The project on definitions for textiles would cover specifically denim, broadcloth, and percale sheets, according to the OPACS request.

"Definitions are essential for the proper interpretation of standards and specifications which may be adopted in connection with price ceilings or allocation of materials for manufactured articles," it is explained.

"There is an urgent need for definitions in the case of some textiles for which price ceilings have been announced or are under consideration. The present lack of recognized definitions is particularly serious with regard to certain of these textiles, if tendencies toward constructions not mentioned in price ceilings with resultant quality changes and deteriorations and other controversies are to be avoided.

"We request that your Association immediately undertake the formation of definitions for certain textiles for which there is serious need of such definitions. For emergency action we submit the following three textiles for which we ask that definitions be developed in accordance with your Defense Emergency Procedure: Denim; Broadcloth; Percale Sheets."

Under the new ASA defense emergency procedure, the chairman of the ASA Standards Council is now considering whether the four projects requested by OPACS shall be initiated as ASA defense emergency projects.

Arnold Says Simplification OK with Anti-Trust Laws

To allay any fears in the minds of manufacturers that they might run afoul of the anti-trust laws if they took concerted action to reduce the number of styles and sizes in the interest of national defense, Assistant Attorney General Thurman Arnold has written a letter to Undersecretary of Commerce Wayne C. Taylor indicating the sympathetic attitude of the Department of Justice toward simplification as developed by the National Bureau of Standards.

Mr. Arnold said:

"I concur fully in the proposition that the more general adoption of 'Simplified Practice,' as developed by the National Bureau of Standards in cooperation with various industries, would constitute an important aid to national defense. . . .

"I understand from your plan of procedure that simplification and standardization proposals will originate with defense agencies, the Department of Commerce and industry, and that conferences will be held with representatives of specific industries and interested Government agencies to obtain advice and information on particular proposals.

"In my view, continued adherence to the specific purpose of simplification will not raise any questions under the Federal anti-trust laws."

Good Housekeeping Drops Its Seals of Approval

The Good Housekeeping certification program reached a new stage during the past month with an announcement from Warren C. Agry, publisher, that the magazine will cease to issue its seals of approval. Mr. Agry explained that "the defense program has dictated so many changes and substitutions in the manufacture of consumer goods that Good Housekeeping's laboratories are no longer equal to the testing job which backs up the seals."

Both the "tested and approved" seal of the Good Housekeeping Institute (used on mechanical appliances, household utensils, soaps, cleaners, etc.) and the "recommended" seal of the Good Housekeeping Bureau (used for foods, drugs, and cosmetics) will be entirely withdrawn.

The guaranty seal, however, will continue to be issued as before, with slight changes in appearance but none in scope or wording. It reads, "Replacement or refund of money guaranteed by Good Housekeeping if defective or if not as advertised therein." Its use will be restricted to Good Housekeeping advertisers. This has been the case in the past, while the approved and recommended seals on the other hand had been used by both advertisers and nonadvertisers.

Good Housekeeping will continue to issue its guaranty seal in the revised form shown here

In the past the guaranty seal has been used chiefly for products outside the scope of Good Housekeeping's testing laboratories. Mr. Agry now suggests that Good Housekeeping advertisers who have been using the approved and recommended seals replace them with the guaranty. Good Housekeeping will continue to allow use of the guaranty in advertising and promotion outside its own pages.

Advertisers will be allowed to use the approved and recommended seals until their seal agreements with Good Housekeeping, usually written for a year, run out. The testing laboratories will continue to function, Mr. Agry announces.

Weights and Measures Conference Re-elects Briggs President

Dr. Lyman J. Briggs, Director of the National Bureau of Standards, was re-elected president at the Thirty-first National Conference on Weights and Measures, held in Washington June 3 to 6. In his opening address, at the Conference, Dr. Briggs announced the completion of the Bureau's vehicle-scale testing program, but said that the Bureau might be able to conduct a limited number of surveys in States that have not yet secured adequate testing equipment.

The Conference went on record as favoring some changes in the specifications, tolerances, and regulations for weighing and measuring devices, and favored the adoption of a new code for single-service containers (except milk bottles). Changes were recommended in regulations governing the sale of 16 classes of commodities, such as meats, dried fish, flour, tea, cheese, paper of various kinds, matches and twine.

The Conference also recorded its approval of legislation now pending in Congress concerning the use of net weights in interstate and foreign commerce transactions in cotton.

Among the most important actions of the Conference was approval of a proposed Federal bill for food package standardization. The bill provides for mandatory packing of retail packages of food, with the exception of malt liquors, wines, and spirits, in certain prescribed units, on either a weight or volume basis depending upon the nature of the commodity.

Officers of the Conference for the coming year are: President—Lyman J. Briggs, National Bureau of Standards; Vice-Presidents— J. F. Blickley, Pennsylvania; G. K. Heath, Maine; M. A. Hubbard, Virginia; J. G. Rogers, New Jersey; W. P. Reed, Georgia; L. E. Witt, Wisconsin; Secretary—Ralph W. Smith, National Bureau of Standards; Treasurer—George F. Austin, Detroit, Michigan.

Standard Dimensions For Boys' Bodies

—Will serve as the basis for garment sizes for junior boys

by Harry Simons[1]

Member, ASA Sectional Committee on Standardization of Children's Garments

FOR years everyone engaged in the production and merchandising of children's garments, from the designer down to the retail salesman, has hunted for a properly sized garment. During the entire period of the development of the ready-made industry and the art of constructing garment patterns, the cutter and the designer of the trade have searched for a dependable set of measurements that would give complete satisfaction for a given size. Some success has been attained by those who are engaged in manufacturing garments for adults. Nevertheless, this has not altered the situation among the manufacturers of children's garments because of the great variation of stature and circumference for a given period of growth.

As the industry grew, the problem of size regulation became more acute. This was primarily due to the increasing number of manufacturers who entered the field each year and the fact that each one of these manufacturers used his own specifications or those of his customers.

The result has been that if a retailer buys children's garments from a dozen different concerns he has that many variations of a given size. Some of the larger volume manufacturers who deal with such concerns as mail-order houses, large department stores, and chain store organizations are compelled to follow the buyers' specifications. If one manufacturer produces garments for a half dozen of these organizations, he will have that many variations of the same size.

All these variations have made for considerable confusion. The manufacturer has often asked himself the questions: "Which one of these concerns is right? What should the correct measurements be for a given size?"

He has indeed been in a quandary. Like Diogenes, he has been merely seeking for the truth, but no matter how loud he cries for an answer to his question, all he hears is his echo.

The reason for this is that he started off on the wrong premise by basing his size on age alone. He has continued to follow this practice up to the present time, despite the fact that many of the outstanding anthropologists, who, in the last thirty years, have surveyed the measurements of children at different times as to stature, weight, and age, have definitely demonstrated that children of the same age vary considerably in stature.

Dr. Burt T. Baldwin and Dr. Thomas D. Wood, who are considered authorities on physical standards and who made quite a comprehensive study of the measurements of boys and girls between the ages of five and nineteen years, found a great divergency in the growth in all ages. For example, children of eight years of age were found to measure from 42 to 56 inches in stature; ten years of age from 47 to 60 inches; twelve years of age from 50 to 65 inches; fourteen years of age from 54 to 71 inches; and sixteen years of age 59 to 74 inches. Nevertheless, the garment

Next step toward standard sizes of clothing to fit new standard body sizes will be agreement on the amount of tolerance to be allowed for ease, comfort, and practical use

[1] Director, Garment Technical Institute.

The new American Standard, Body Sizes for Boy's Garments (L11.1-1941), is the first standard developed by the ASA Sectional Committee on Standardization of Sizes of Children's Garments and Patterns, L11.

The committee brings together clothing manufacturers, pattern manufacturers, and body form manufacturers, clothing designers, retail stores, and consumer groups, and is working under the leadership of the American Home Economics Association.

Copies of the new standard are available from the American Standards Association at 25 cents each.

manufacturers continue to manufacture garments and label them by size according to age only.

The age-size designation has made for a great deal of grief. If it were possible to tabulate the total amount that it has cost the retailer and manufacturer to alter garments and the loss that is taken on account of returned garments due to faulty proportions and wrong size designations, the amount would be staggering.

During the last fifteen to twenty years some of the progressive buyers and manufacturers began to question the measurements used in the making of patterns for boys' garments and the tolerance allowed for ease and comfort. These inquiries in a measure brought to the attention of the Government the necessity of obtaining reliable, definite information on the body measurements of boys and girls of various ages.

More than two-hundred-million dollars are invested each year in fabrics and labor in manufacturing children's garments in this country. This business has been, in reality, based on a rule-of-thumb method. Millions of dollars worth of garments have been manufactured without careful consideration of the body proportions of these children, who were to wear them. For years the industry has moved on a trial-and-error basis, adding and deducting here and there so as to attempt to meet the requirements of the consumers.

The first definite and practical step made to obtain a dependable list of body measurements to be used as a basis for proper sizing and pattern making for children's garments was begun in 1937 by the Bureau of Home Economics of the U.S. Department of Agriculture. In March 1939, the measurements of 148,088 boys and girls ranging in size from four to seventeen years of age were finally completed. These measurements were taken in fifteen states covering both the higher and lower economic levels.

From that time on, the ASA Sectional Committee on Standardization of Sizes of Children's Garments (L11) has held many meetings which have been attended by representatives of organizations including the U.S. Government, consumer organizations, retailers, department stores, mail-order concerns, chain store organizations, buyers, designers, and form manufacturers. The first definite, concrete step as a result of these meetings was recently accomplished with the adoption of a set of standard body sizes for junior boys developed by the ASA Sectional Committee. This set of sizes is shown in Table 1.

Two proposals are now before the sectional committee. These cover a group of boys' body sizes from one to five and a range of boys' body sizes from thirteen to eighteen inclusive. Should these be approved by the committee at the next meeting, we will then have a complete set of size designations that will cover from one to eighteen, inclusive. This set of sizes will not increase the number of sizes carried previously by retailers

Table 1

New Set of Junior Boys' Body Sizes Recently Adopted

(All measurements in inches)

Stature (Height)	Hip Girth	Chest Girth	Waist Girth	Average Age of Groups of Boys Measured in BHE Research		
				Size Group	Yrs	Mos
43	22½	22½	20½	C-2	5	8
45½	23	23½	21	C-3	6	6
47½	24	24	21½	C-4	7	5
50	25	25	22	C-5	8	5
52	26	26	22½	C-6	9	7
54½	27½	27	23	C-7	10	8
57	28½	28	23½	C-8	11	9

The overalls (both size 6) on this little boy show why mothers want standard sizes

The seven manikins (below) show the range of American Standard boys' body sizes. Agreement on tolerances to be allowed for the proper fit of garments is the next step before clothes of standard sizes can appear on the market

Courtesy U. S. Bureau of Home Economics

and manufacturers. The fact is that it will in a great measure decrease the number of sizes carried in stock because it will make the sizing of garments uniform. Buyers will, therefore, be able to figure out the relative quantity of the various sizes required to a more exact degree after a little experience with these new sizes.

For those manufacturers who desire to give better service to the consumer it will be possible to add stouts and thins to this list of sizes, as the occasion requires. This group of size designations is primarily for the regular or average-built child. Each one of these size considerations will have a definite measurement for circumference, for height, and weight as a basis from which to calculate other sectional measurements in the drafting of patterns.

It is obvious that the technical men in the various clothing manufacturing concerns who are in charge of designing and pattern making should not experience any difficulty in arranging their grading according to these size designations so as to meet the circumference and length of the various parts of the patterns of the different sizes.

Before going into the final phase of pattern making it will be essential to come to a complete understanding as to the amount of tolerance for seams, ease, and comfort required on the finished garment so as to fit the body forms made according to the measurements gathered by the recent survey of the Bureau of Home Economics

of the U.S. Department of Agriculture. When this is finally accomplished many a headache will be relieved. The size question for once will be finally stabilized. The result will be a great saving in time and effort for both manufacturer and retailer of children's garments since these size designations will cover all garments made for children.

The keen interest manifested by the buyers of large chain organizations, mail-order concerns, and other concerns in rearranging these children's sizes indicates a successful conclusion of this project.

New Association and Government Standards

(See "ASA Standards Activities", page 255, for new American Standards and progress on ASA projects)

Since the publication of the August issue of INDUSTRIAL STANDARDIZATION, the ASA Library has received for its classified files copies of standards and specifications from the organizations listed below.

These standards may be consulted by ASA Members at the ASA Library.

Anyone desiring copies for his own use should write direct to the organization issuing the standard.

Associations and Technical Societies

Air Conditioning and Refrigerating Machinery Association (717 Southern Building, Washington, D. C.)

Ammonia Compressors and Condensing Units, 1.0 1941 40¢

Ammonia Condensers and Receivers, 2.0 1941 50¢

Ammonia Brine Coolers, 3.0 1941 40¢

Miscellaneous Ammonia Standards, 4.0 1941 25¢

Self-Contained Air Conditioning Units, 5.0 1941 35¢

Freon-12 Condensers and Receivers, 6.0 1941 35¢

Miscellaneous Freon-12 Standards, 7.0 1941 25¢

(Compete set of above seven Equipment Standards $1.50)

Code of Application Engineering Standards for Air Conditioning for Comfort. 50¢

American Institute of Electrical Engineers (33 West 39th Street, New York, N. Y.)

Revised Report on Standards for Fuses Above 600 Volts, No. 25 July 1941 No charge.

AIEE Test Code for Direct-Current Machines, No. 501 July 1941 50¢

American Railway Engineering Association (59 East Van Buren Street, Chicago, Ill.)

1941 Supplement to AREA Manual of Recommended Practice. $1.00

American Society of Heating and Ventilating Engineers (51 Madison Avenue, New York, N. Y.)

Heating, Ventilating, Air Conditioning Guide 1941. $5.00

Illuminating Engineering Society (51 Madison Avenue, New York, N. Y.)

Revised Recommended Practice for the Illumination Performance of Residential Luminaires. July 1941

Institute of Traffic Engineers (60 John Street, New York, N. Y.)

Adjustable Face Traffic Control Signal Head Standards. Technical Report No. 1 1941

International Acetylene Association (30 East 42nd Street, New York, N. Y.)

IAA Standard Hose Connection Specifications. Adopted 1939.

National Association of Fan Manufacturers (5-208 General Motors Building, Detroit, Mich.)

Standard Test Code for Centrifugal and Axial Fans. Bulletin No. 103 3rd printing—April 1941 25¢

National Electrical Manufacturers Association (155 East 44th Street, New York, N. Y.)

NEMA Motor and Generator Standards. No. 41-64 July 1941 Supersedes No. 38-49. $3.50

National Fire Protection Association (60 Batterymarch Street, Boston, Mass.)

Table of Common Hazardous Chemicals. 5th edition, 1941 25¢

Radio Manufacturers Association (1317 F Street, N. W., Washington, D. C.)

Vacuum Tubes—Terminal Cap Dimensions. Sheet 802 April 1941 Replaces issue of March 1932.

Vacuum Tubes—Base Dimensions. Sheet 803 April 1941 Replaces issue prior to 1936.

Society of Automotive Engineers (29 West 39th Street, New York, N. Y.)

Aircraft Engine Pipe Plugs. January 1941

Aircraft Engine Plain and Slotted Nuts. January 1941

Aircraft Engine Taper Pins. January 1941

Aircraft Engine Copper Asbestos Gaskets. January 1941

Aircraft Engine Primer Fittings. January 1941

Wrought Aluminum, Spec. No. 281. 1941

Air Cleaner Test Code. 1941

Certificates of Maximum Horsepower. 1941

Hydraulic Brake Hose. 1941

Electric Supplementary Driving Lamps. 1941

Electric Supplementary Passing Lamps. 1941

Rating System for Inclusion in Steel. 1941

Method of Rating Magnaflux Indications. 1941

All of above 5¢ per sheet; also are included in 1941 SAE Handbook, $5.00. Handbook likewise includes additions and revisions of 34 previous standards.

Underwriters' Laboratories, Inc. (161 Sixth Avenue, New York, N. Y.)

Standard for Nonmetallic-Sheathed Cable, 4th edition. July 1941

Standard for Snap Switches, 3rd edition. August 1941

United States Government

National Bureau of Standards (Washington, D. C.) Commercial Standards

In Print (Copies available from Superintendent of Documents, Government Printing Office, Washington, D. C.)

Oak Flooring. CS56-41 2nd edition, 1941 5¢

Diamond Core Drill Fittings. CS17-42 3rd edition, 1941 10¢

Simplified Practice Recommendations

Approved by Standing Committee and Circulated to Industry

Metal Lath. R3

Corrugated and Solid Fibre Shipping Boxes for Canned Fruits and Vegetables. R146

Large-Tube Cast-Iron Radiators. R174

In Print (Copies available from Superintendent of Documents, Government Printing Office, Washington, D. C.)

Classification of Iron and Steel Scrap. R58-36 (Reaffirmed Jan. 1940) 5¢

Surgical Gauze. R86-41 5¢

Corrugated Fibre Boxes—Used by Department and Specialty Stores. R128-41 5¢

Packaging of First-Aid Unit Dressings and Treatments. R178-41 5¢

Structural Insulating Board (Vegetable Fibre). R179-41 5¢

(A list of Simplified Practice Recommendations as revised to July 1, 1941, is available.)

Federal Specifications Executive Committee (U. S. Treasury Department, Washington, D. C.)

The date after the title of the specification indicates when the specification becomes effective.

Federal Specifications

Labels; poison (New) G-L-51 October 1, 1941

Shelving; steel, storage. (Superseding AA-S-271) AA-S-271a October 1, 1941

Rulers; desk. (Superseding GG-R-791) GG-R-791a October 1, 1941

Iron; pig, foundry. (Amendment 1) QQ-I-676 October 1, 1941

Wire; phosphor-bronze, spring. (Amendment-1) QQ-W-401 October 1, 1941

Trays, catheter; corrosion-resisting-steel, with cover, (New) RR-T-626 October 1, 1941

Labels; vial. (New) UU-L-56 October 1, 1941

Gowns; operating. (Superseding DDD-G-601) DDD-G-601a October 1, 1941

Tape; linen-finish, red. (Amendment-1) DDD-T-101 October 1, 1941

Levels and plumbs. (Amendment-2) GGG-L-211 October 1, 1941

Cabbage; fresh. (Amendment-1) HHH-C-26 October 1, 1941

Mallets and mauls; wood. (Amendment-2) LLL-M-71 October 1, 1941

Cloth; abrasive, aluminum-oxide. (Amendment-2) P-C-451 October 1, 1941

Wire, steel; market. (New) QQ-W-432 October 1, 1941

Cans; waste (oily). (New) RR-C-114 September 15, 1941

Brick; paving. (Amendment-1) SS-B-671a October 1, 1941

Couplings; hose, cotton (rubber-lined) and linen (unlined) (Superseding WW-C-621) WW-C-621a October 1, 1941

Pillowcases; cotton, bleached. (Amendment-1) DDD-P-351 October 1, 1941

Motors; alternating-current, fractional-horsepower, single-phase and universal. (New) CC-M-636 October 1, 1941

Cans, waste; sanitary, foot-operated. (New) RR-C-121 October 1, 1941

Emergency Alternate Federal Specifications

Wire, steel; market. E-QQ-W-432

Cable (armored and lead-covered-armored) and Cord (armored); (600 volt service and under). (Superseding E-J-C-71 dated 5/23/41) E-J-C-71 dated 7/29/41

Gaskets, rubber; molded, sheet, and strip. E-HH-G-156

Packing, rubber; cloth-insertion. E-HH-P-151a

Packing; rubber, wire-insertion. E-HH-P-161a

Hose; fire, linen, unlined. E-JJ-H-571

Cans; sprinkling. E-RR-C-94

Tags; shipping and stock. E-UU-T-81b

Aluminum-pigment-paste; (for) paint. E-TT-A-466a

Aluminum-powder; (for) paints (aluminum-bronze-powder). E-TT-A-476

Hardware, builders'; locks and lock-trim. E-FF-H106

Aluminum alloy (aluminum-manganese); bars, rods, shapes, and wire. E-QQ-A-356a

Aluminum alloy (aluminum-manganese); plates and sheets. E-QQ-A-359

Aluminum; bars, rods, shapes, and wire. E-QQ-A-411a

Aluminum; plates and sheets. E-QQ-A-561

Iron and steel; sheet tinned (tin-plate). E-QQ-I-706a

Solder; tin-lead. E-QQ-S-571a

Terne-plate (long ternes). E-QQ-T-191

Cans; oil (kerosene). E-RR-C-85

Thread; linen. E-V-T-291a

Machines, vegetable-peeling; electrically-operated. E-OO-M-106

Laundry appliances. (Superseding E-OO-L-131b dated 6/29/41) E-OO-L-131b dated 8/27/41

U. S. Marketing Service (U. S. Department of Agriculture, Washington, D. C.)

United States Standards for Grades of Canned Asparagus

Tentative United States Standards for Grades of Canned Lemon Juice

OPACS Consumer Division Sets Up Standards Group

THE first meeting of a new Standards Advisory Panel which has been appointed to meet once a month with the Standards Section of the Consumer Division of OPACS was held August 22. The panel will consider how standards, grades, and quality-identifying labels can be used as an aid in giving the consumer as much material and equipment as possible under the limitations of the defense program.

Representatives of commercial and private standards-formulating, standards-promulgating, and standards-using companies and agencies whose work covers consumer goods in general are members of the panel. The following organizations were invited to appoint representatives to attend the first meeting: Sears-Roebuck; Kaufman's; Bamberger; American Standards Association; United States Testing Laboratory; Consumers Research; Consumers Union; and the Intermountain Consumer Services.

To help carry out its program, Dr. Robert A. Brady, director of the Standards Section, has also set up a second advisory committee. This committee, made up of state, municipal, and institutional purchasing agents, will promote the use of standards and quality specifications among public and institutional purchasing agents throughout the country. It also held its first meeting August 22.

In addition to these two panels, the Standards Section has organized technical committees within the government to consult on technical problems in connection with standards. These committees are set up along commodity lines, with members drawn from such agencies as the National Bureau of Standards, the Agricultural Marketing Service, the Pure Food and Drug Administration, and the Bureau of Home Economics.

It is planned that the advice of all these groups will furnish the basis for recommendations on standards to be presented by the Consumer Division to OPACS Administrator Leon Henderson.

Bancroft Gherardi

Bancroft Gherardi, former vice-president of the American Telephone and Telegraph Company and president of the American Standards Association in 1931 and 1932, died of a heart attack August 14 at the age of 68. Mr. Gherardi had been one of the leading communication engineers of the United States, and had received the 1932 Edison Medal "for contributions to the art of telephone engineering and development of electrical communication." In accepting the award in the Spring of 1933 he pointed out that when he first became connected with a telephone company in 1895 the longest circuit was between New York and Chicago.

Mr. Gherardi received the degree of Bachelor of Science from Polytechnic Institute in Brooklyn in 1891, and two years later he took his degree of Mechanical Engineering from Cornell University and in 1894 the degree of Master of Mechanical Engineering. At the time of his death he was trustee of Cornell University. He was given the honorary degree of Doctor of Engineering by Brooklyn Polytechnic Institute in 1933, and also by the Massachusetts Institute of Technology in 1936.

When Mr. Gherardi started work testing cables for the Metropolitan Telephone and Telegraph Company, parent of the New York Telephone Company, in 1895, there were only 300,000 telephones in the United States. In 1901 he became chief engineer of the New York and New Jersey Telephone Company, and when that company became two separate organizations in 1906 he became assistant chief engineer of both. In 1907 he became equipment engineer of the Bell System, and in 1909 was made engineer of plants, in charge of development and standardization of the system. He became acting chief engineer of the American Telephone & Telegraph Company in 1918 and chief engineer and vice-president two years later.

Among Mr. Gherardi's outstanding engineering accomplishments were the construction of the Boston-Washington underground cable, completion of three trans-continental lines, and the building of the New York-Chicago cable.

Mr. Gherardi was one of 14 leading scientists elected to the National Academy of Science in 1933 and was chairman of the Academy's engineering section from April, 1935 to April, 1938. He was president of the American Institute of Electrical Engineers in 1927. He was nominated for membership on the ASA Board of Directors by the AIEE when the Board was first organized in 1929 and was a member from that time until 1934, serving as president for two terms (1931 and 1932).

ASA Standards Activities

Approved Standards Available Since Publication of Our August Issue

Calcined Gypsum for Dental Plasters (ASTM C 72-40) American Standard A65.1-1941 25¢

Keene's Cement (ASTM C 61-40) American Standard A66.1-1941 25¢

Gypsum Lath (ASTM C 37-40) American Standard A67.1-1941 25¢

Gypsum Sheathing Board (ASTM C 79-34) American Standard A68-.1-1941 25¢

Gypsum Wall Board (ASTM C 36-34) American Standard A69.1-1941 25¢

Methods of Testing Gypsum and Gypsum Products (ASTM C 26-40) American Standard A70.1-1941 25¢

Body Sizes for Boys' Garments American Standard L11.1-1941 25¢

Standards Approved Since Publication of Our August Issue

T-Slots, Their Bolts, Nuts, Tongues and Cutters (Revision of B5a-1927, from status of American Tentative Standard) American Standard B5.1-1941

Jig Bushings (Revision of B5.6-1935) American Standard B5.6-1941

Preferred Thicknesses for Uncoated Thin Flat Metals (Under 0.250 In.) American Standard B32.1-1941

Safety Rules for the Installation and Maintenance of Electrical Supply and Communication Lines—Part 2 of the National Electrical Safety Code (Revision of C2.2, part 2) American Standard C2.2-1941

Definitions of Special Terms—Section 1 of the National Electrical Safety Code (Revision of C2, section 1) American Standard C2.7-1941

Definitions of Electrical Terms American Standard C42-1941

Safety in Electroplating Operations (Revised Scope of Z9) American Standard Z9.1-1941

Grinding, Buffing and Polishing Equipment Sanitation American Standard Z43-1941

Standards Now Being Considered by Standards Council for ASA Approval

Manhole Frames and Covers for Subsurface Structures A35.1

Specifications for Gypsum (ASTM C 22-25) (Revision of A49.1-1933)

Screw Thread Gages and Gaging B1.2

Acme and Other Translating Threads B1.3

Keyways for Holes in Gears B6.4

Cast-Iron Pipe Flanges and Flanged Fittings, Class 250 (Revision of B16b-1928)

American Standard Safety Code for Jacks B30

Gage Blanks CS 8-41 (Revision of B47-1933)

Electric Fences, Part 6 of the National Electrical Safety Code C2, Part 6

Protection of Structures Containing Inflammable Liquids and Gases—Part 3 of Code for Protection Against Lightning (From status as American Tentative Standard to American Standard) C5, Part 3

Methods of Test for Impact Resistance of Electrical Insulating Materials C59.11

Commercial Standards for Sun Glass Lenses (CS 78-39; CS 79-39)

Specifications for Basic Sulfate White Lead (ASTM D 82-38) K47

Specifications for Blue Lead: Basic Sulfate (ASTM D 405-38) K48

Specifications for C.P. Para Red Toner (ASTM D 475-40) K49

Specifications for C.P. Zinc Yellow (Zinc Chromate) (ASTM D 478-40) K50

Methods of Test for Alkalinity or Acidity of Pigments (ASTM D 278-31) K51

Methods of Test for Bleeding of Pigments (ASTM D 279-31) K52

Methods of Test for Hygroscopic Moisture (and Other Matter Volatile Under the Test Conditions) in Pigments (ASTM D 280-33) K53

Methods of Test for Oil Absorption of Pigments (ASTM 281-31) K54

Methods of Test for Acetone Extract in Dry Lampblack and Dry Bone Black (ASTM D 305-31) K55

Methods of Test for Tinting Strength of White Pigments (ASTM D 332-36) K56

Methods of Test for Mass Color and Tinting Strength of Color Pigments (ASTM D 387-36) K57

Methods of Chemical Analysis of Yellow and Orange Pigments Containing Chromium Compounds, Blue Pigments, and Chrome Green (ASTM D 126-36) K58

Methods of Chemical Analysis of Dry Mercuric Oxide (ASTM D 284-33) K59

Proposed American Recommended Practice for the Use of Explosives in Anthracite Mines M27

Specifications for Drinking Fountains Z4.2

Safety Code for Laundry Machinery and Operations (From status as American Tentative Standard to American Standard) Z8

Gas Water Heaters (Revision of Z21.10-1937)

Listing Requirements for Attachable Gas Water Heating Units (Revision of Z21.26-1937)

Approval Requirements for Gas Counter Appliances Z21.31

Graphical Symbols for Use on Drawings in Mechanical Engineering (Revision of Z14.2-1935) Z32.11

Public Approval and Certification Procedures Z34

Defense Emergency Standards

Standards Under Way

Allowable Concentration of Acetone Z37

Allowable Concentration of Azides, Lead and Sodium Z37

Allowable Concentration of Cadmium Z37.5

Allowable Concentration of Ether Z37

Allowable Concentration of Manganese Z37

Allowable Concentration of Tetryl Z37

Allowable Concentration of TNT Z37

Allowable Concentration of Xylol Z37

Requests for Projects Being Considered

Definitions of Textiles

Electric Refrigerators

Domestic Washing Machines

Electric Flat-irons

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